★ ★ ★ CONTENTS ★ ★ ★

#47

TRADE NAME	MODEL	FOLDER NO.
TELEVISION COURSE—INSTALLMENT No. 10		
Aircastle	WRA1-A	4817-1
Aircastle	7015	4817-2
Arvin	241P, 244P, 2410P (Ch. RE-244, RE-254, RE-255, RE-256, RE-259)	4817-3
Browning	PF-12, RJ-12	4817-4
Coronado	43-7851	4817-5
Crosley	9-302	4817-6
Delco	R-1253, R-1254, R-1255	4817-7
Espey	Chassis 7B	4817-8
Ford	8MF881 (8C-18805B)	4817-9
Hoffman	C504, C514 (Ch. 123)	4817-10
Majestic	8JL885 (Ch. 4810B)	4817-11
Masco	MC-10	4817-12
Motorola	48L11 (Ch. HS-113)	4817-13
National	NC-33	4817-14
National	NC-108R, NC-108T	4817-15
Operadio	1A70-A	4817-16
Packard-Bell	881-A, 881-B	4817-17
Philco	48-1290	4817-18
Philco	48-485, 49-1100	4817-19
Recordio	7E40, 7E44	4817-20
Sonora	401	4817-21
Stewart-Warner	B72CR1 (Code No. 9038A)	4817-22
Temple	H-411	4817-23
Truetone	D3811 (Fact. No. 114BXH)	4817-24
Truetone	D4832 (Fact. No. 25C22-82)	4817-25
Westinghouse	Record Changer V4914	4817-26

PUBLISHED BY HOWARD W. SAMS & CO., INC., 2924 EAST WASHINGTON STREET, INDI

EXPORT: AD. AURIEMA, 89 BROAD STREET, NEW YORK 4, N. Y., U. S.

ENVELOPE AND CON

The PHOTOFACT Servicer

OCT. 1, 1948 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ VOL. 5, No. 47

ROBERT M. ELLIS, *Editor*

FOSTER PARENTS TO FIFTY ORPHANS

In an address delivered to the conference of the National Electrical Retailers Association in Chicago, July 13th, and reported in the August, 1948, issue of Radio & Appliance Journal, Mr. H. C. Bonfig, Vice President of Zenith said:

"In its brief history the radio industry has seen 788 brand names vanish from the scene—in the past two years alone, more than fifty radio manufacturers have gone out of business, leaving several hundred thousand orphaned sets in the hands of dealers and the public."

Please Mr. Bonfig—those several hundred thousand sets may be orphans, but they have foster-parents! Most all of them have been covered by PHOTOFACT Folders, making top-notch service still possible, with profit to the service technician and satisfaction to the set-owner! That is the PHOTOFACT contribution to the industry and to the service profession.

★ ★

TELEVISION LECTURES

Are you afraid of television servicing? Are you being bluffed by the technical double-talk of "super-man" qualifications for this work? We find that a lot of really good service technicians feel that way. The feeling is unfounded. A television receiver is an electronic device. Who can have a better instinct for locating and correcting trouble in electronic equipment than the man who is grounded in practical radio receiver servicing? Competence involves principally a comprehension of certain fundamental circuits.

In previous SERVICERS we have mentioned the genius of A. C. W. Saunders for presenting television in a straight-forward, easy-to-understand form. His lectures form the basis of the PHOTOFACT Television Course which has found such popular acceptance. Now arrangements are being made so that many of you will be able to hear Mr. Saunders in person. Through the cooperation of Howard Sams, a lecture tour has been arranged, and during the next six months talks to service groups will be made in all parts of the country. Keep in touch with your PHOTOFACT distributor for information on the lecture schedule. Many of our readers will be able to hear Mr. Saunders in his own, or in a neighboring community.

A noted lecturer and teacher, Al Saunders is also a radio service man with more than twenty years practical experience. He has studied, experimented and worked with television for many years—back to the days of mechanical scanning. Saunders' black-board illustrations of video circuits with analogies to radio circuits and mechanical equivalents constitute a most illuminating demonstration of technical material. To a man, service technicians have said that Saunders' talks are the most interesting and useful they have ever heard.

In the East where Mr. Saunders has been working with service groups on television for a couple of years, it is not uncommon for service men to drive as far as 300 miles just to attend one of his lectures. At a meeting in Rochester, New York, attended by your editor, at least six service technicians had driven 175 miles from lower New York State to sit in on Al's lectures. May we urge that you make a sincere effort to attend the nearest lecture. You will be well rewarded by the wealth of down to earth information you can glean from his talk.

★ ★

NEW MICROGROOVE EQUIPMENT

As promised in SERVICER No. 45 we will bring you the latest developments in equipment for the new "LP" long-playing Microgroove records.

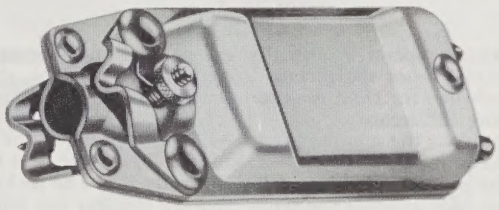
The Astatic Corporation of Conneaut, Ohio, has announced their new FL-33 Pickup, really a "honey" for the high quality reproduction of the new long-playing records. It features quick conversion between standard and "LP" records by means of plug-in interchangeable crystal cartridges; the LP-33 cartridge being used for "LP" records; and the accessory broader-needled LP-78 cartridge being used for standard records.

Also available is the "FL" Filter which suppresses the high-frequency resonant peak existing on most crystal cartridges and which may be objectionable in a high-fidelity audio system with an extended range speaker.

Above: Astatic FL-33 Pickup

Inset: Plug-in Cartridge System Used in the Astatic FL-33

The Webster Electric Company of Racine, Wisconsin, is offering their "F-11," a double-needle turn-over type crystal cartridge. One replaceable needle is provided with a one-mil osmium-tipped point;



The Double-Ended Webster F-11 Cartridge

the other needle is of the conventional three-mil size. The proper mounting of the cartridge calls for a tone-arm having provision for rotating the cartridge, and an automatic counter-balancing system of the type used on the V-M Record Changer described in SERVICER No. 45.

A number of ingenious two-speed turntables are appearing on the market. Except for the speed-changing mechanism these turntables are similar to the older models, and their operation may be readily comprehended on inspection by the radio service technician.

★ ★

BINDER NUMBERS

Our thanks go to several patrons who have offered the constructive suggestion that we make available gummed stickers for identifying the volume number on PHOTOFACT Binders. We are keenly aware of this requirement, and we hope to have labels of this kind to offer our subscribers in the near future.

The problem is not as simple as it might at first seem. A special treatment of the binder covers, given to make them durable and to provide a glossy, easy-to-clean finish, makes their surface practically

non-adhering to the usual commercial adhesives. To date, we have not been able to locate a satisfactory gummed label at a commercially practical price.

However, we feel sure that there must be a suitable product available; and when we locate it, announcement will be made in the columns of the SERVICER. In the meantime, temporary labeling can be made with patches of white adhesive tape, which can be marked as desired.

★ ★

TELEVISION QUESTION AND ANSWER FORUM

The announcement of the "Television Question and Answer Forum" in SERVICER 43, has brought forth a volume of correspondence about various television problems. However, practically all letters have dealt with special requirements, important to the individual, but not "Forum" material.

We quote our original announcement:

"The study of the PHOTOFACT Television Course may bring to your mind questions and comments on the theory or practice of television. We want these questions because they will help us to tailor the television course to your requirements.

"Questions of general interest on subjects covered by preceding lessons will be answered in these columns. Read the 'Forum' regularly. It is probable that the answers to typical questions will answer many special questions of your own."

Let's have your cooperation and make this an interesting department.

★ ★

FIELD EXPERIENCES

Here is your opportunity for passing practical service experiences to others for the benefit of all. For every service "Field Experience" published, we issue to the author a certificate that is good for one PHOTOFACT Folder Set. Since it is impossible to verify the accuracy of contributions, we cannot be responsible for either the diagnosis made of the receiver trouble, or the results which will be obtained by following the suggested repair routine. All contributions become the property of Howard W. Sams & Company, Inc.

★ ★

WEBSTER 50

Photofact 4714-35, Set 24

"Erratic landing.

"This is usually due to the small lug on the pickup arm raising disc being bent inward too far. This lug limits the outward travel of the pickup arm. When it is bent, the arm travels out too far and the pickup arm raising lever (PHOTOFACT Item 55) fails to enter the notch in the pickup arm raising disc (PHOTOFACT Item 52)."

★

WEBSTER 56

Photofact 477-36, Set 17

"The changer operates normally except that pushing the 'On-Reject' button causes the pickup to return and drop on the 'Off' button even when the changer is completely loaded. This occurs only when playing 12" records.

"The trouble is the same as listed above for Model 50. The lug on the pickup arm raising disc (PHOTOFACT Item 70) may be bent inward, allowing the pickup arm to swing too far outward. The pickup arm raising lever fails to reach the notch and the changer can only drop the arm on the 'Off' button. This does not occur during normal operation because the arm is too far inward at the end of a record; it occurs only when the arm is out on the rest and the 'On' button is pushed. It is significant to notice the difference in symptoms in these two changers when the cause of malfunction is the same in each case. Intermittent appearance of this trouble sometimes occurs; in this case, the lug may be only slightly bent."

Submitted by: Mr. Francis C. Wolven,
R. F. D. No. 2, Box 178, Saugerties, New York

★ ★

ZENITH 5D027

Photofact 463-17, Set 3

"Complaint: Motorboating at the low frequency end of the dial.

"I added a .1 mfd. capacitor from point 'B' of the oscillator coil to the receiver chassis and the trouble was gone. I left the regular .05 mfd. condenser (PHOTOFACT Item 14) in place. It was o.k. as were all other condensers in the set.

"The trick described above often works on other models of similar design."

Submitted by: Mr. W. J. Baker, Baker Radio,
1400 Bryan Avenue, Lexington 5, Kentucky

WESTINGHOUSE H-122, H-130

Photofact 466-35, Set 6

"The complaint is a loud hum on phonograph only. When the phono plug is removed from the set and the set is in the phono position, no hum is present; but when the plug is placed in the receptacle, the hum is objectionable. The set is o.k. on the radio position.

"Remedy: Remove the .1 mfd. condenser, PHOTOFACT Item 17; and run a wire from the phono cable shielding direct to the common ground. This clears up all hum and the set will operate normally again."

Submitted by: Mr. B. McGehee, Benny's Radio Shop,
411 Arcadia Avenue, Arcadia, Florida

★ ★

PHILCO 48-225, 48-230, 48-206

Photofact Folders 15 and 16, Set 37

"Whistling and motorboating after a brief warm-up, when the set is tuned to the low-frequency end of the dial, may be caused by a defective line isolating condenser, PHOTOFACT Item 13. This trouble generally shows up after the customer has used the set for a few days after the original purchase. Replacement of this condenser must be made with Philco No. 30-4644 as this is a special resonant condenser."

Submitted by: Mr. Eugene Heitkotter,
Heitkotter Electric Service, Chester, Nebraska

Editor's Note: Sprague Resonant Condensers (See SERVICER 40) are designed for this application.

★ ★

MOTOROLA 508

Photofact 489-13, Set 39

"Complaint: Set dead.

"The first i.f. transformer, PHOTOFACT Item 57, has a dummy pin on the base which normally makes no internal connection. This dummy pin or terminal is used as a tie-point for a B+ connection.

"In this particular instance, the terminal had excess solder attached to it under the base of the can. This solder had worn through the mica of the fixed trimmer, shorting the plate connection to B+. After clipping off this solder and reassembling the can the set played normally."

Submitted by: Mr. Tom Morrison,
Morrison Radio, Marion, New York

★ ★

MOTOROLA 5A5, CHASSIS HS-15

Photofact 463-11, Set 3

"When the set loses sensitivity at the lower end of the dial, the trouble can usually be traced to an open .02-100 volt by-pass condenser in the small by-pass block. This is the one with the white and red leads.

"No gain in this model may be due to a short in the diode trimmer on the secondary of the i.f. transformer, PHOTOFACT Item 41. The resistance of this i.f. winding should be 35 ohms checked from the white to the white and black wire coming out from the i.f. transformer.

"Distortion and low volume will often be traced to an open in either the 1 meg. resistor, PHOTOFACT Item 27, in the 1S5 tube plate or the 4.7 meg. resistor, PHOTOFACT Item 26, in the 1S5 screen."

Submitted by: Mr. Frank Krantz, Krantz Radio,
4627 Rising Sun Avenue, Philadelphia 40, Pa.

EDITOR'S NOTE: The d.c. resistance of the secondary of the i.f. transformer, Item 41, Motorola Part 1X24886 measured 12.5 ohms for the sample we had in our laboratory.

PUBLICATION DATES

When will other sets of PHOTOFACT Folders be published?

Volume 5—Set No. 48	**Oct. 15**
Volume 5—Set No. 49	**Nov. 15**
Volume 5—Set No. 50	**Nov. 15**
Volume 6—Set No. 51	**Dec. 15**

If you have been unable to get any issues of PHOTOFACT *Folder Sets, send your order and money directly to us and we will see that you are supplied.*

TRANSMITTER TEST PATTERNS FOR RECEIVER ADJUSTMENT

For a period of from fifteen to thirty minutes preceding each television broadcast, the station transmits a test pattern or chart which usually carries the station's call letters or a distinguishing insignia. This same test pattern is frequently broadcast for longer periods of time when no regular television program is scheduled. The purpose of the test pattern is to provide the television service technician with a useful "tool" to assure proper adjustment of the various receiver controls which effect a correct presentation of the television picture. Another purpose of the test pattern is to give the user an opportunity to adjust the front panel controls for the best picture before the regular program starts. Such controls as horizontal and vertical hold, horizontal and vertical centering, linearity in both directions, and sharp focus can all be precisely adjusted by the use of the test pattern. In this section we will present a review of the use of those controls which have been discussed up to this point and show their effect upon the appearance of a transmitted pattern.

Figure 111 shows the appearance of a typical transmitted test pattern as received on a correctly-adjusted modern television receiver. The various characteristics of the pattern are similar in application to those of a more complex test chart which has been developed as a standard by the television transmitter committee of the Radio Manufacturers Association engineering department. This R. M. A. standard resolution chart is used in testing the performance of both television transmitters and receivers and a study of its features will serve to explain the use of less complicated television broadcast station test patterns such as Figure 111.

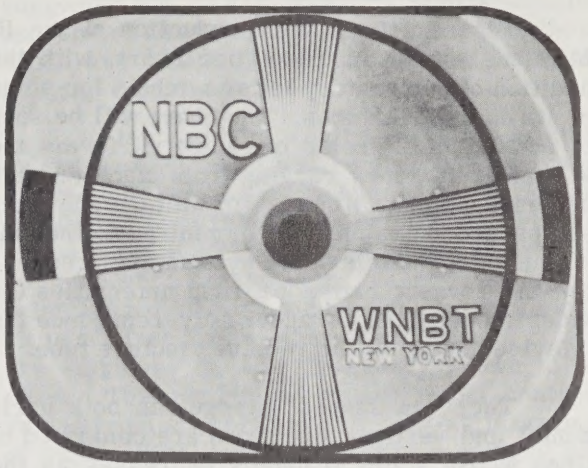


Fig. 111. Normal Transmitted Test Pattern

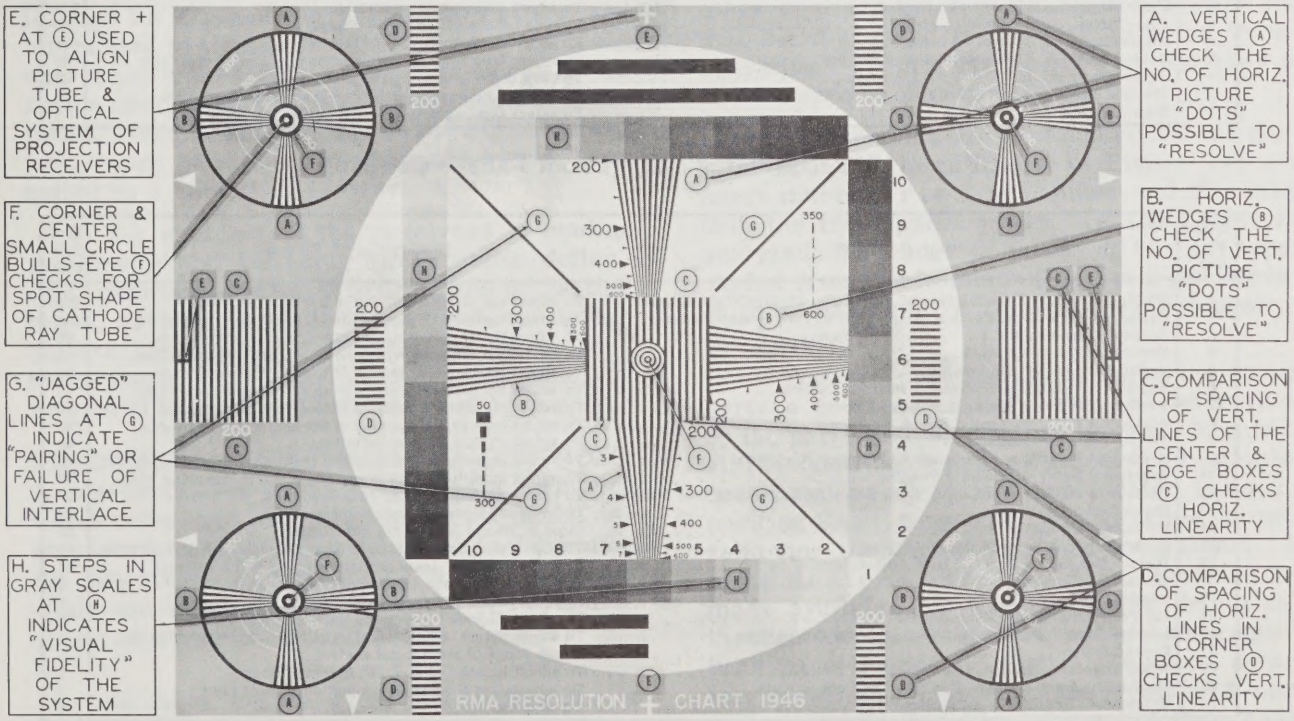

E. CORNER + AT (E) USED TO ALIGN PICTURE TUBE & OPTICAL SYSTEM OF PROJECTION RECEIVERS
F. CORNER & CENTER SMALL CIRCLE BULLS-EYE (F) CHECKS FOR SPOT SHAPE OF CATHODE RAY TUBE
G. "JAGGED" DIAGONAL LINES AT (G) INDICATE "PAIRING" OR FAILURE OF VERTICAL INTERLACE
H. STEPS IN GRAY SCALES AT (H) INDICATES "VISUAL FIDELITY" OF THE SYSTEM
A. VERTICAL WEDGES (A) CHECK THE NO. OF HORIZ. PICTURE "DOTS" POSSIBLE TO "RESOLVE"
B. HORIZ. WEDGES (B) CHECK THE NO. OF VERT. PICTURE "DOTS" POSSIBLE TO "RESOLVE"
C. COMPARISON OF SPACING OF VERT. LINES OF THE CENTER & EDGE BOXES (C) CHECKS HORIZ. LINEARITY
D. COMPARISON OF SPACING OF HORIZ. LINES IN CORNER BOXES (D) CHECKS VERT. LINEARITY
RMA RESOLUTION + CHART 1946

Fig. 112. R. M. A. Standard Transmitter Test Chart. (Courtesy R. M. A. Data Bureau)

Copyright 1948. HOWARD W. SAMS & CO., INC. All Rights Reserved.

Figure 112 is a reproduction of the R. M. A. television resolution chart, with the addition of explanatory letter symbols for some of its salient features. The chart will be seen to consist of a series of geometric forms and a number of tones ranging from black through a series of gray steps to white. The gray scales are of value in determining whether all elements of the television system are preserving the correct ratios of light intensities (as video modulation) to accurately reproduce the televised scene at the receiver picture tube.

The "fan shaped" wedges in both horizontal and vertical directions are composed of lines whose width gradually decreases as the lines approach the center. By observing the point at which the lines are no longer distinguished from one another, an estimate of the "resolving power" of the television system including the receiver under test, can be determined. The standard test chart shows by numbers placed beside the horizontal and vertical wedges, the corresponding numbers of lines which are being reproduced when the individual lines of the fan are just distinguishable from one another. It should be noted that the vertical fans of the test picture are used to determine the performance of the horizontal system of the receiver and conversely the horizontal fans of the test pattern are used to determine vertical receiver performance.

Tests for vertical and horizontal linearity, as well as other requirements, such as interlace, are also provided by this chart and are described in the captions accompanying the chart. Their application in the simplified type of pattern represented by the station transmission of Figure 111 will be discussed in greater detail, as we consider the effect on the reproduced pattern caused by maladjustment of controls or malfunctioning of the various circuits.

CONTROLS - THEIR USES AND ADJUSTMENT

In our study of the operation of the circuits employed for the production of the scanning raster, the control of this scanning by signal pulses and the modulation and focusing

Order of Use	Name of Control	Function of the Control	% of Sets Use
1	Station Selector, Channel Selector, T. V. Tuning	To select the desired T. V. Station.	100
2	Volume, Volume Control, Sound Volume	To adjust the sound volume.	100
3	Brightness, Brilliance, Background	To adjust average light intensity.	95
4	Contrast, Picture, Picture Control	To adjust video signal amplitude.	100
5	Fine Tuning, Sharp Tuning, Vernier	To tune accurately to sound channel.	85
6	Focus, Focusing Control	To adjust C. R. tube spot definition.	55
7	Horizontal Hold, Horizontal Speed, Framing	To adjust free running period of the horizontal oscillator.	40
8	Tone, Tone Control	To vary audio frequency response.	35
9	Vertical Hold, Vertical Speed	To adjust free running period of the vertical oscillator.	30
10	High-Low Bandswitch	To select input system for high or low channel group.	5

Fig. 113. "Operating" or "Front Panel" Controls

Order of Use	Name of Control	Function of the Control	% of Sets Use
1	Width, Horizontal Size, Horizontal Amplitude, Picture Width Control	To adjust the picture size in the horizontal direction.	100
2	Height, Vertical Size, Vertical Amplitude, Picture Height Control	To adjust the picture size in the vertical direction.	100
3	Vertical Linearity No. 1	To adjust the scanning wave shape in the vertical plane.	80
4	Horizontal Linearity No. 1	To adjust the scanning wave shape in the horizontal plane.	75
5	Vertical Hold, Vertical Speed	To adjust free running period of the vertical oscillator.	70
6	Horizontal Centering, Horizontal Position Control	To adjust the picture position in the horizontal direction.	70
7	Vertical Centering, Vertical Position Control	To adjust the picture position in the vertical direction.	70
8	Horizontal Hold, Horizontal Speed, Framing	To adjust free running period of the horizontal oscillator.	60
9	Focus, Focusing Control	To adjust C. R. tube spot definition.	45
10	Horizontal Oscillator Frequency Adjustment, Horizontal Lock	To adjust frequency of sine-wave oscillator (A. F.C. control).	45
11	Horizontal Drive, Horizontal Peaking	To adjust amplitude of peak portion of horiz. scanning wave	30
12	Horizontal and Vertical Centering by Adjustment of Focus Coil Position	To center scanning raster in both planes.	30
13	Focus Coil Adjustment	To adjust spot size by focus coil position.	30
14	Horizontal Linearity No. 2	Same as item 4 (secondary adjustment).	25
15	Horizontal Oscillator Phase Adjustment	To adjust phase of horiz. oscillator to pulse rate (A.F.C. disc.)	20
16	Picture Cut-Off or C. R. T. Bias Adjustment	To adjust "black" level of picture tube (grid 2 voltage).	10
17	Horizontal Linearity No. 3	Same as items 4 and 14 (tertiary adjustment).	5
18	Vertical Linearity No. 2	Same as item 3 (secondary adjustment).	5
19	Ion Trap Adjustment, Beam Bender	To adjust current through the ion trap magnet coils.	5
20	Service Control, Screen Voltage Horizontal Output Tube	To adjust output of horizontal amplifier (aux. width control).	5
21	Coarse Focus	To set range of main focus control.	5
22	Phase Detector Balance	To adjust balance of A. C. F. discriminator.	5
23	Excitation, Anode Voltage Control of Projection Tube	To adjust operating point projection picture tube.	5
24	Brightness, Brilliance, Background	To adjust average light intensity.	5

Fig. 114. "Non-Operating" or Pre-Set Controls (Not on Front Panel)

of the cathode-ray beam, we have covered the action of a number of variable adjustments known as controls. Controls can be generally classified in two distinct groups:

1. "Operating" or Front Panel Controls. These controls which are located on the front panel of the receiver are operated by the user. They normally include the sound level volume control with an associated switch to turn the receiver on and off, a station selector to allow the set to be tuned to the desired television broadcasting station and a group of controls to adjust the appearance of the picture. The picture control group permits the user to adjust the brilliance, contrast, clarity and stability of the image.

2. "Non-Operating" or Pre-Set Service Controls. The circuit controls which require adjustment only during original installation or at infrequent intervals are located in such a position that they are not readily accessible to the user. Most television manufacturers, realizing that the proper adjustment of these "service type" controls determines the satisfactory operation of the receiver, insist that these controls be accessible only to well qualified, authorized television service technicians. The number and complexity of these pre-set or semi-fixed adjustments differ greatly between the designs of individual manufacturers.

The Radio Manufacturers Association through its engineering standards group are attempting to standardize the names of controls and their functions. Due, however, to the accelerated pace of receiver production in its initial stage and the enthusiasm of sales and advertising departments, controls have been called by a variety of names.

An analysis of the receivers of leading manufacturers, including electrostatic deflection, electromagnetic deflection and projection types, reveals the fact that as yet, no design pattern has evolved to determine which controls should be placed on the front panel or relegated to a position within the receiver.

PLACEMENT OF ADJUSTABLE CONTROLS: A representative group of television receivers which from our analysis covers all of the design variations, has been studied to determine the placement of controls. The results of this study are presented in the form of two charts shown as Figures 113 and 114.

In these charts, the control function is first described by the name which has been suggested for radio industry standardization and the other names following it are those which are still in use in the service literature of many companies.

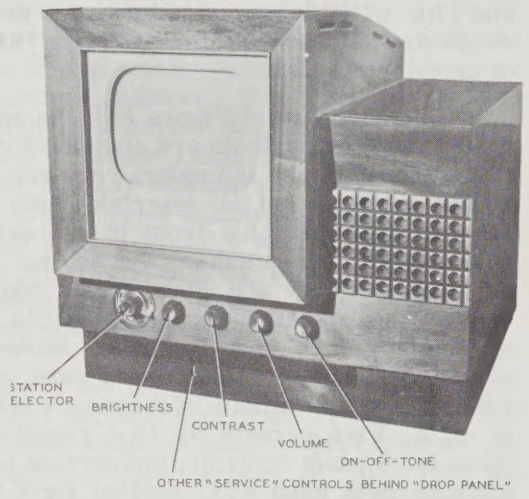
In the chart of Figure 113, the operating or front panel controls are classified in order of frequency of use in modern receiver design. It will be seen that all television sets employ at least three of the front panel controls in common with one another. These are: station selector, volume, and contrast. In addition to these three basic operating controls, others are employed in the frequency shown in the chart. The number of front panel controls varies from a minimum of three to a maximum of eight. Five percent of the receivers had three front panel controls, ten percent had five, forty percent used six, another forty percent employed seven and the remaining five percent had eight controls.

Figure 115 shows typical examples of the layout of receivers employing from five to eight front panel controls. The functions of the various controls are "called-out" on the pictures. It will be noted that concentric control knobs are employed in certain designs for reasons of styling and simplicity of operation.

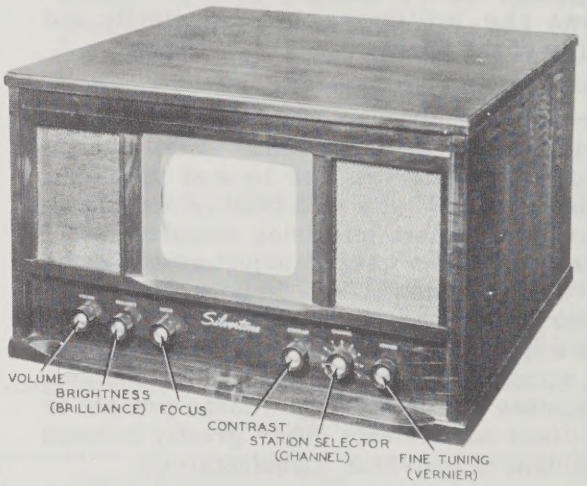
The functions of the station selector, volume, and contrast controls are properly a part of the study of RF and Video amplifiers and will be covered later in the course. The other controls listed in the chart of Figure 113 will be discussed in common with the "non-operating" or pre-set controls analyses in chart shown as Figure 114.

The controls to be adjusted by the service technician and listed in Figure 114 are much more varied in number and diversity than the front panel group. In the receivers analyzed, the range of usage of these types varied from a minimum of five in a table model to a maximum of fifteen in a large projection receiver.

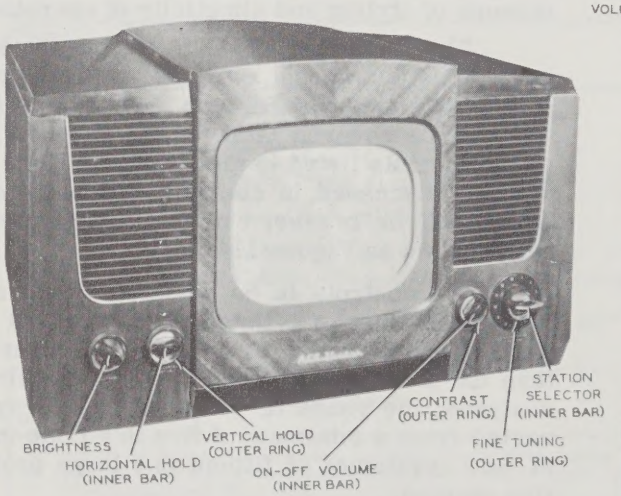
The pre-set controls are mounted on any surface or plane of the chassis as determined by the particular mechanical design. In general, the controls which will most likely require occasional readjustment are located in such a position that they will be accessible without removing the chassis from the cabinet. In some designs certain of these controls are made available by knob or screw driver slot through the back panel and do not require back panel removal. Figure 116 shows a variety of designs indicating the location of many of the controls listed in the chart of Figure 114.



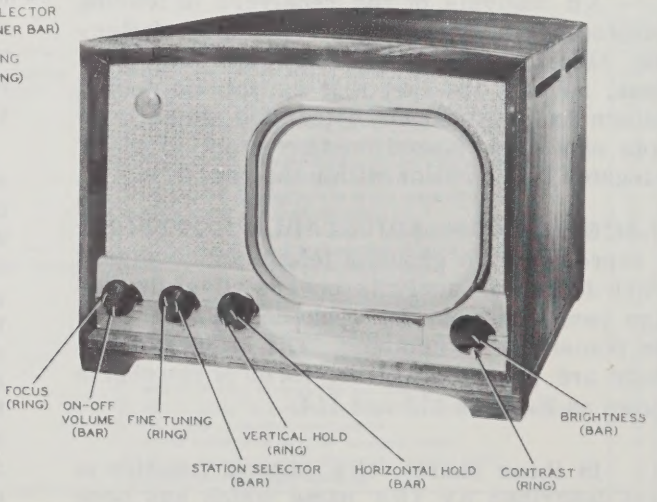
Receiver example employing five front panel controls. (Photo from a sample receiver courtesy the Philco Corporation.)



Receiver example employing six front panel controls. (Photo from a sample receiver courtesy Sears Roebuck & Co.)



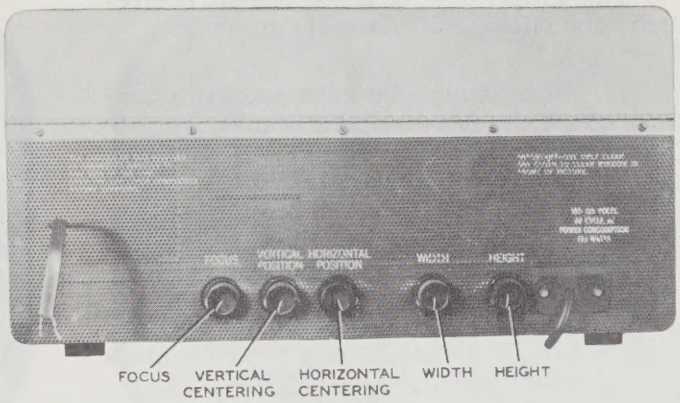
Receiver example employing seven front panel controls. (Photo from a sample receiver courtesy R. C. A.)

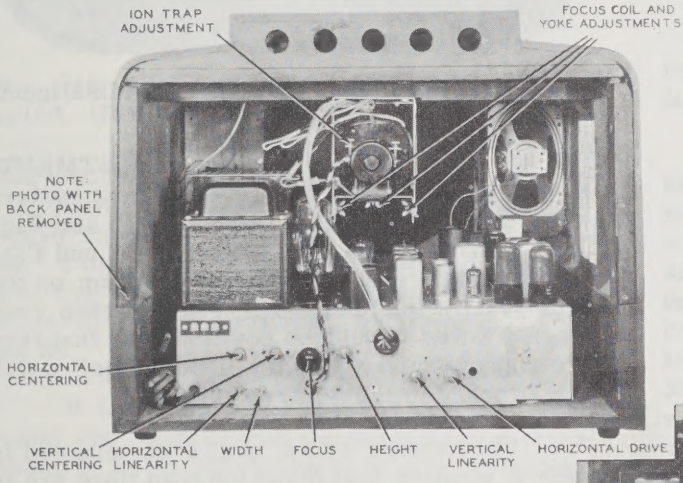


Receiver example employing eight front panel controls. (Photo from a sample receiver courtesy General Electric Company.)

Fig. 115. Typical Examples of Operating or Front Panel Controls

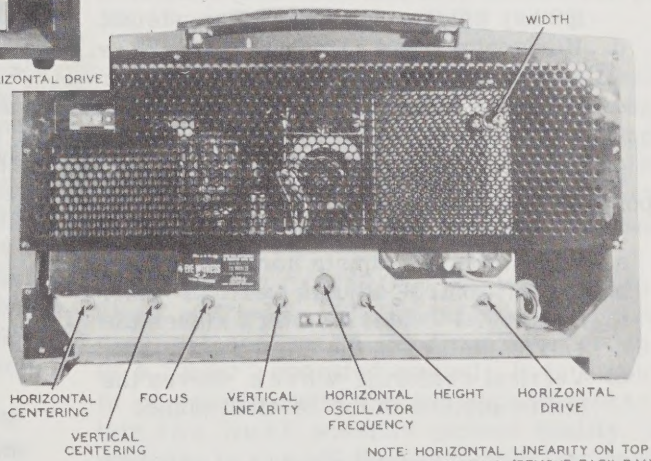
An example of service controls available without removal of the back panel. (Photo from sample receiver courtesy the Hallicrafters Co.)

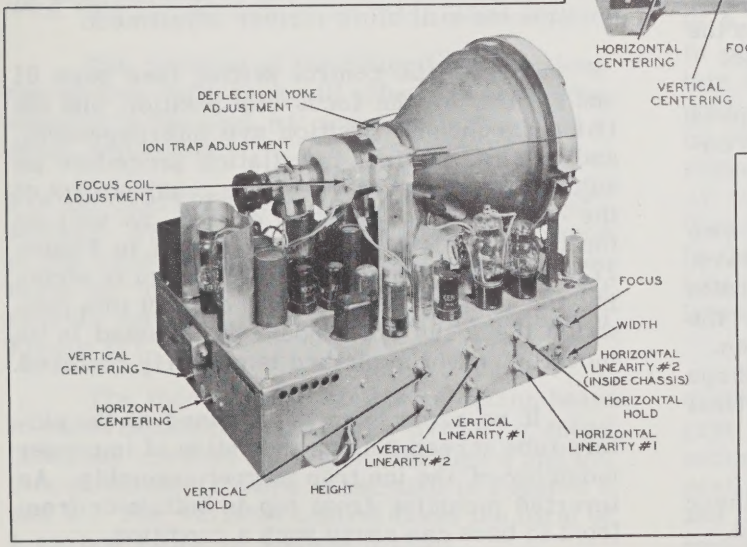




An example of service controls available at back of chassis. Back panel removable for servicing picture tube. (Photo from sample receiver courtesy Emerson Radio and Phonograph Corp.)

An example of service controls at the back of the chassis with top chassis and tube controls available by removing protective screen. (Photo from sample receiver courtesy R. C. A. Mfg. Co.)





An example of service controls available on top, back and side of chassis. (Photo from sample courtesy the Motorola Co.)

Fig. 116. Typical Examples of Non-Operating or Pre-Set Controls

The controls of a television receiver may be classified into four main groups:

1. Those which adjust the operating conditions of the cathode-ray picture tube.

   a. Adjustment of ion trap position and current to return the beam to screen.
   b. Adjustment of the deflection yoke to position scanning raster correctly.
   c. Focus to obtain sharp definition.
   d. Adjustment of C-R tube operating voltages to establish proper "black level" and highlight brightness.
   e. Control of scene brightness.

2. Those which establish the correct "lock in" or hold of the horizontal and vertical scanning oscillators.

   a. Horizontal hold which sets the free running frequency of the horizontal scanning oscillator.
   b. Vertical hold which sets the free running frequency of the vertical scanning oscillator.
   c. Horizontal sine wave oscillator frequency adjustment, in A.F.C. systems.
   d. Horizontal discriminator phase control to establish discriminator balance.

3. Those which adjust the dimensions and position of the picture.

   a. Width control adjusts horizontal size.
   b. Height control adjusts vertical size.
   c. Horizontal centering which moves the entire picture in the horizontal plane.
   d. Vertical centering which moves the entire picture in the vertical plane.

4. Those which determine the shape of the scanning voltage waves to produce an undistorted picture.

   a. Horizontal linearity controls the shape of the horizontal scanning wave.
   b. Horizontal drive determines the ratio of pulse to linear sawtooth for the voltage wave in magnetic deflection.
   c. Vertical linearity controls the shape of the voltage wave from the vertical scanning oscillator.

The effect of misadjustment of these controls will be shown in the order outlined.

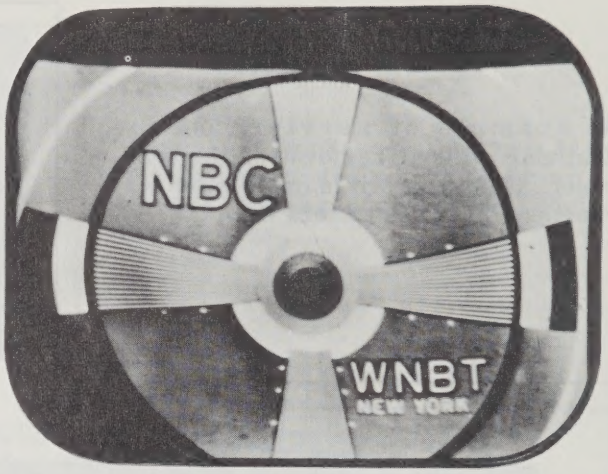


Fig. 117. Focus Coil and Ion Trap Misaligned

FOCUS COIL AND ION TRAP ADJUSTMENT: Figure 117 shows the received test pattern when the focus coil (see pages 14-15 and Figure 17) and the ion trap (pages 16-17 and Figures 20-21) are not in correct position on the neck of the picture tube. The ion trap rear magnet poles should be positioned so that they are approximately over the little "flags" which are attached to the ion trap cylinder.

The picture tube must be mounted in such a position that these ion trap flags are in a horizontal plane when looking down upon the tube. When this has been done, and the tube secured in position, the ion trap can be moved slightly back and forth along the tube neck and at the same time rotated slightly around the tube, until the brightest raster is obtained on the screen. The trap adjustment screws should then be tightened sufficiently to hold the trap in position but still allow further adjustment.

The focus control setting (see page 61 and Figure 73), the focus coil position, and the ion trap magnet position are interdependent, and in the original installation procedure an adjustment of one may require readjustment of the others. The shadowed corner, as well as the poor vertical positioning shown in Figure 117, indicates that the electron beam is striking the neck of the tube. To correct this condition the focus coil should be adjusted in its mounting until the picture is properly centered.

If no raster can be obtained on the picture tube screen it is an indication of improper mounting of the ion trap magnet assembly. An inverted mounting from top to bottom or from front to back can cause such a condition.

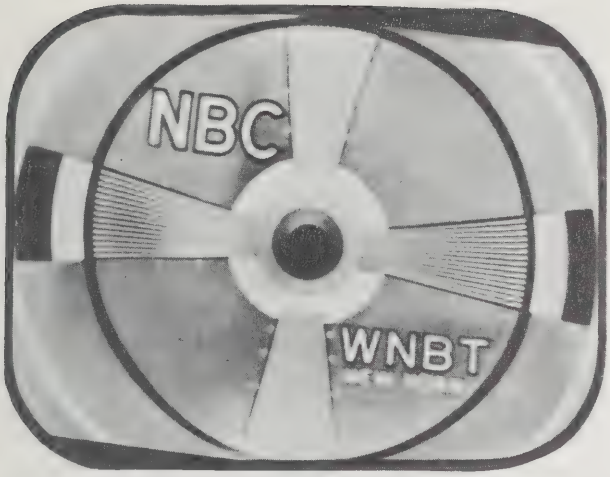


Fig. 118. Deflection Yoke not Properly Adjusted. (Rotated)

DEFLECTION YOKE ADJUSTMENT: Figure 118 shows the effect on the test pattern of improper mounting of the deflection yoke assembly. The action of the deflection coils in moving the electron beam was covered on pages 15-16 and illustrated in Figures 18, 19 and 22.

If the lines of the raster are not horizontal and squared with the edge of the picture mask, it is an indication that the deflection yoke, made up of both the horizontal and the vertical deflection coils, is not correctly positioned. To correct this condition the adjustment screws which hold the yoke should be loosened, and the coil assembly rotated about the axis of the tube until the raster is properly lined up with respect to the edges of the picture mask. The yoke adjustment screws or wing nuts should then be securely tightened.

The position of the deflection yoke along the picture tube neck will affect the deflection sensitivity (amount of scanning voltage for a given deflection).

FOCUS CONTROL AND FOCUSING ADJUSTMENTS: Figure 119 illustrates the appearance of the received test pattern when the electron beam is "out of focus". The image is not sharply defined as in the normal picture of Figure 111.

The theory of focusing the electron beam in electrostatically controlled picture tubes has been covered on pages 5 through 8 and the circuit elements were illustrated in Figures 8 and 11. The variable control takes the form of a carbon type of voltage divider.

Fig. 119. Focus Control Misadjusted

Electromagnetically focused picture tubes require two separate service adjustments. The first is the mechanical positioning of the focus coil as covered under "Focus Coil and Ion Trap Adjustments", and the second is the variation of the current through the focus coil by means of a variable resistor. The action of the focus coil has been covered on pages 14, 15 and 61. (Figures 17, 22 and 73.)

The best focus adjustment is made by sliding the focus coil back and forth along the neck of the picture tube while adjusting the focus control and watching the test pattern for the sharpest picture. In some designs two variable controls (coarse and vernier) are used.

BRIGHTNESS CONTROL: As indicated in the chart of Figure 113, the brightness control is usually made one of the front panel group and is a "user" operated control. It is employed in conjunction with the contrast control to obtain the best possible picture quality. It is possible to cut off the beam with this control, in which case no picture is seen and the tube remains dark. Conversely, too high a setting of the contrast control will result in a light, "washed out" picture as shown in Figure 120. In this case the shadows and lower key half tones have disappeared and the vertical retrace lines have become visible.

The circuit function of the brightness control is to establish the operating control grid bias of the picture tube. Two methods of accomplishing this bias control have been described on pages 107 and 108. Figures 110B and 110C show the circuit arrangements employed.

Fig. 120. Brightness Control Misadjusted. (Brightness too High)

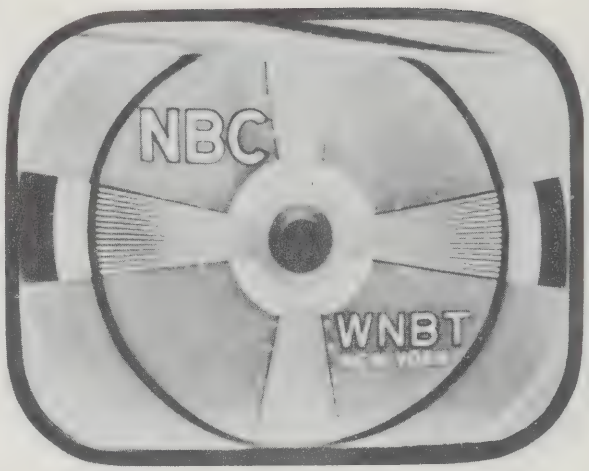


Fig. 122. Horizontal Hold Control Misadjusted

HOLD ADJUSTMENTS: Hold adjustments, both horizontal and vertical, enable the television technician, or user, to adjust the free running frequency of the two receiver scanning systems so that a stable condition of synchronism or lock-in with the transmitted sync pulses is obtained.

In "flywheel" or A. F. C. sync systems, the hold control is of the same type, but it is placed in the grid circuit of a sine wave oscillator. Its function is to control the phase of the oscillator with respect to the sync pulses. (See pages 101 through 105.)

In the case of "triggered" sync systems (see page 101) these controls are variable resistors in the scanning oscillator circuit. (See pages 45 through 56 and the circuit diagrams of pages 73 through 84.)

HORIZONTAL HOLD ADJUSTMENT. Figures 121 and 122 illustrate the effect on the receiver test pattern of two degrees of misadjustment of the horizontal hold control. The actual appearance of the image cannot be reproduced in a printed illustration since the image is in continual motion until a stable lock-in has occurred. When the hold control is adjusted to such a position that the oscillator is nearly in sync with the signal pulses, the image will first appear as a series of diagonal bars similar to those of Figure 124, which is an illustration of horizontal oscillator frequency misadjustment. As synchronism is approached more closely, the image will appear as in Figure 121 and then start to lock-in as in Figure 122.

VERTICAL HOLD ADJUSTMENT. Figure 123 shows the effect of misadjustment of the vertical hold control. The effects on the

Fig. 121. Horizontal Hold Control Misadjusted

Fig. 123. Vertical Hold Control Misadjusted

picture are similar to those discussed for "Horizontal Hold" except that, in this case, the motion of the image, before lock-in occurs, is from the bottom to the top of the picture rather than from left to right.

Careful adjustment of vertical hold is essential to avoid "pairing" of horizontal lines of alternate fields which would reduce the vertical definition of the picture.

HORIZONTAL OSCILLATOR FREQUENCY ADJUSTMENT (A. F. C. SYSTEMS). In the flywheel or A. F. C. system of horizontal sync control, described on pages 101 through 108, the major control of the free running frequency of sine wave oscillation is seen to be the tuning of the circuit by adjusting an iron core in the inductance (see Figure 105). With reference to this figure, it will be noted that the horizontal hold (R7) and the discriminator phase control (adjustment of primary L1-L2) also exert an effect on the oscillator frequency. For this reason, the adjustment of the horizontal oscillator frequency must be re-checked if it is found necessary to change the discriminator phase control. The hold control should be set at the middle of its range while making these adjustments.

The service manuals of the television receiver manufacturers contain explicit instructions concerning the order in which these adjustments are to be made in the particular A. F. C. circuit design.

The final setting of this control should be such that, with the hold control at either end of its range, the scanning system will lock-in to signal sync. To test for this condition, tune to a signal while the control is in its mid-position. The hold control is then turned to its extreme position in either direction. Next the signal is removed by detuning the receiver. Upon retuning the system should pull into sync. The same check should then be made at the other end of the control range. If the receiver will not pull into sync at both ends of the hold range, the horizontal oscillator frequency should be readjusted until this is accomplished.

HORIZONTAL DISCRIMINATOR PHASE ADJUSTMENT. As described on pages 101-108, the discriminator stage compares the sync pulse rate with the horizontal oscillator rate or frequency and delivers a DC voltage for the control of the oscillator. If the voltage at the plates of the two diodes, impressed by the oscillator, is equally divided, the DC output will not be zero at the correct time for retrace at the end of the horizontal line. This off-balance condition will result in the received test pattern shown in Figure 125.

In this case, the picture is locked-in and steady but retrace has occurred at the wrong time in the scanning cycle. The black band at the right side of the picture is the blanking period during which horizontal retrace should have occurred.

The adjustment of this control, for retrace at the proper instant, also affects the setting of the horizontal oscillator frequency adjustment as previously described. The service technician should follow the service manual of the receiver manufacturer for the proper sequence of adjustment of these controls.

Fig. 124. Horizontal Oscillator Frequency Misadjusted. (A. F. C. System)

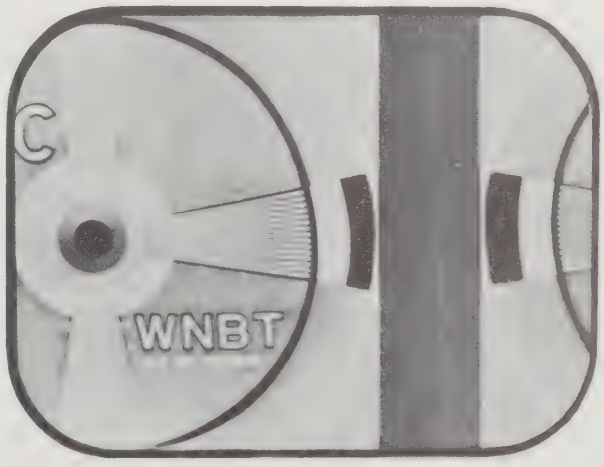


Fig. 125. Horizontal Discriminator Phase Misadjusted

PICTURE SIZE AND CENTERING CONTROLS. The group of controls which are used to fit the picture to the mask or frame are, in most instances, mounted on the back or side and are not "user" operated. Included in this group are: width, height, horizontal centering, and vertical centering.

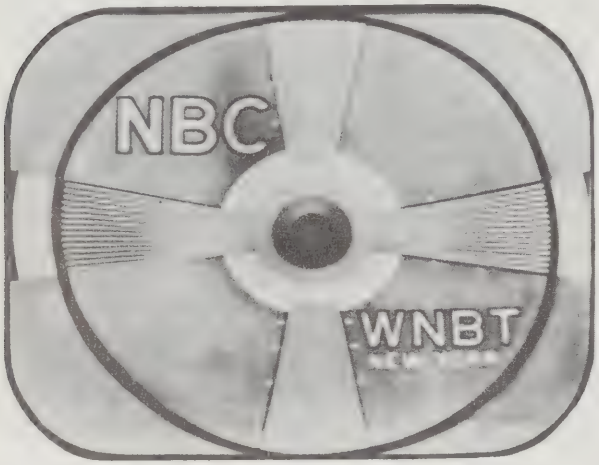


Fig. 126. Width Control Misadjusted

WIDTH CONTROL. The width control adjusts the voltage applied to the horizontal deflection plates or the deflection coil. The effect on the received test pattern, when this control is not properly adjusted, is shown in Figure 126.

Width control can be accomplished by regulating the output of the horizontal oscillator, as described on pages 44 through 48, or by controlling the output of either the discharge tube or horizontal amplifier. (See the Figures on pages 74 through 84.)

In many instances the width control is not a single adjustment, since the effect of changing other controls, such as horizontal linearity and horizontal drive, may require a readjustment of the width control.

HEIGHT CONTROL. The height control serves a similar function to that of the width control but in the vertical direction. In this case, the vertical oscillator or vertical amplifier is controlled in output.

Figure 127 shows the effect of an incorrect adjustment of the height control on the received test pattern. In this case, as well as that of the width control (Figure 126), the picture is shown as "too high", or "too wide", but symmetrical with respect to the center of

Fig. 127. Height Control Misadjusted

the picture. Often the picture is found to be both incorrect in size and "off center". It will be necessary to adjust the size controls (width and height) simultaneously with the horizontal and vertical centering controls.

The methods and circuits employed to accomplish height control are similar to those described for width. The same page and Figure references apply.

HORIZONTAL CENTERING. Misadjustment of the horizontal centering control will cause an effect on the received test pattern similar to that shown in Figure 128.

As shown in the chart of Figure 114, two distinctly different methods of centering the picture are employed. The mechanical mounting of the focus coil may be provided with screw adjustments to accomplish both horizontal and vertical centering. Electrical circuit

Fig. 128. Horizontal Centering Control Misadjusted

means for accomplishing centering have been described on page 11 for the electrostatic type, and on pages 61-62 for the electromagnetic type.

When centering is accomplished by positioning the focus coil, it may be found necessary to make readjustments of the ion trap position simultaneously with the movement of the focus coil, as explained on page 114.

VERTICAL CENTERING. Figure 129 shows the effect of misadjustment of the vertical centering control. As in the case of the horizontal centering control, just discussed, vertical centering is accomplished either by mechanical means (adjustment of the focus coil position) or by electrical means (voltage bias of the plates in an electrostatic picture tube or current bias in the case of an electromagnetic tube). The same text references mentioned under horizontal centering apply also to the methods employed for vertical centering.

Fig. 129. Vertical Centering Control Misadjusted

CONTROLS WHICH AFFECT SCANNING WAVE SHAPE: In the discussion of the sawtooth scanning raster (pages 51 through 60) it was pointed out that the electron beam must trace at a linear rate in both the horizontal and vertical planes to avoid distortion of the picture. The shape of voltage wave (electrostatic) or current wave (electromagnetic) required to produce the linear beam motion has been covered on pages 56 through 60. In the discussion of beam deflection systems (pages 61 through 84) the various circuits and the controls employed to achieve linearity of scanning are discussed in detail.

The output voltage wave of scanning oscillators of the cathode-coupled multivibrator or blocking oscillator type can be made sufficiently linear to satisfactorily operate the electrostatically deflected type of picture tube and, for this reason, linearity controls are not required on sets using such tubes. In the case of magnetically deflected picture tubes, the scanning current wave consists of the combination of a linear sawtooth and a pulse. In the generation of such a wave, it is necessary to incorporate variable controls to achieve the proper time and amplitude relationship of the various sections of the wave shape. These include linearity controls, which may include as many as three for the horizontal scanning, and drive controls which adjust the amplitude of the pulse portion.

HORIZONTAL LINEARITY CONTROLS. Figure 120 shows the effect of the misadjustment of horizontal linearity. It will be noted that the circle of the test pattern has been rendered elliptical or "egg shaped." The picture has been cramped in the middle.

Correction of distortion of various parts of the picture, in the horizontal direction, are accomplished by controls affecting the circuit elements which contribute these portions of the scanning current wave. In the case illustrated by Figure 130, correction could be made by horizontal linearity control (L8 of Figure 73) or a similar adjustment for correcting the center of the picture without affecting the sides. Additional linearity controls, such as resistor R9 of Figure 73, may be employed to correct the right hand side of the picture.

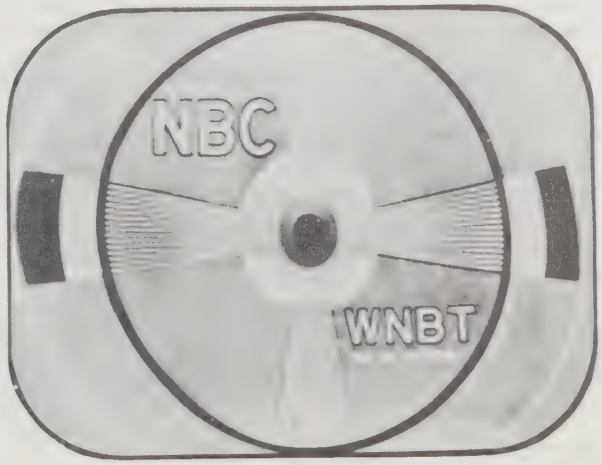


Fig. 130. Horizontal Linearity Control Misadjusted

Since the number and circuit function of linearity controls differ between receiver designs, the television service technician is advised to study the service manual issued by receiver manufacturer for the particular linearity adjustment and the interaction of the control adjustment with other linearity and width controls are invariably covered in the service literature.

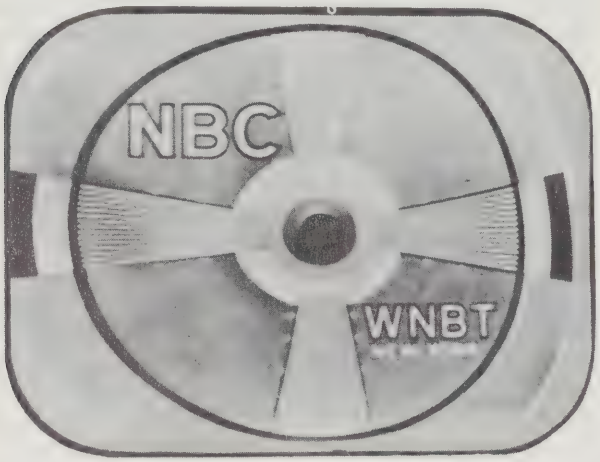


Fig. 131. Horizontal Drive Control Misadjusted

HORIZONTAL DRIVE CONTROLS. The horizontal drive control adjusts the ratio of the pulse to the linear portion of the horizontal sawtooth scanning current wave (pages 65-66). This controls the point on the scanning trace at which the horizontal output tube conducts. The effect of its misadjustment is shown by Figure 131. In effect it is seen to be an auxiliary linearity and width control, since a clockwise rotation will increase the picture width, crowd the right hand side of the picture and stretch the left.

Feedback is often employed in the output stage to provide a negative pulse from the horizontal output transformer to the grid of the output tube. In this case, the drive control is a voltage divider across a winding on the output transformer. The voltage pulse is fed back in series with the output tube grid return.

VERTICAL LINEARITY CONTROL. Figure 132 shows the effect on the transmitted test pattern of the misadjustment of the vertical linearity control. The type of linearity control most often employed in the vertical circuit is an adjustment of the operating point of the vertical amplifier. This usually takes the form of an adjustable cathode bias resistor, such as R7 of Figure 73. Curvature of the plate current versus grid voltage characteristic is employed to produce a "counter-distortion" which corrects any curvature of the voltage wave applied to the grid of this output tube.

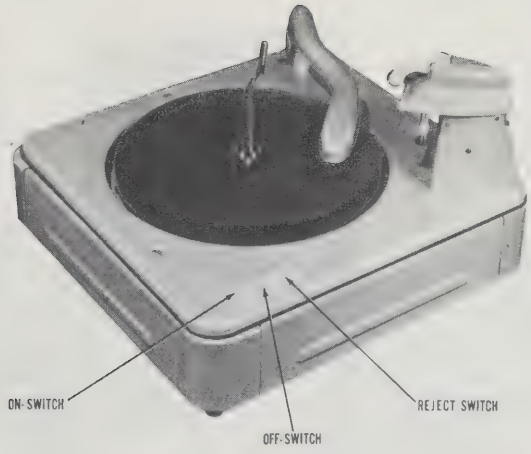
Fig. 132. Vertical Linearity Control Misadjusted

In receivers which employ more than one linearity control, the secondary or additional control to that described, is made a variable resistor in the peaking circuit which constitutes the plate load of the vertical discharge tube. This control acts in a manner similar to the horizontal drive control previously discussed.

In the adjustment of linearity controls of either the horizontal or the vertical type, it should be noted that the result of adjustment is interdependent with the effect of the size (width or height) controls. This interlocking action may necessitate readjustment of one of these controls if it is necessary to adjust the other.

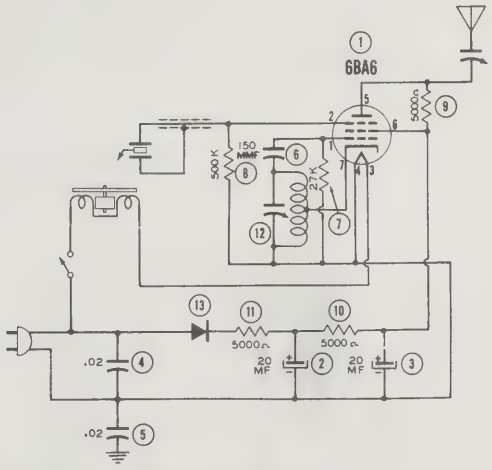
Photographs of transmitted test patterns showing the effect of receiver misadjustments courtesy of the National Broadcasting Company and the R. C. A. Service Company, Inc.

Installment 11 will present a block diagram and review of receiver circuits studied to date.



AIRCASTLE MODEL WRA1-A

TRADE NAME	Aircastle, Model WRA1-A
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Ill.
TYPE SET	AC Operated Wireless Record Player
TUBES (ONE)	Type, 6BA6 Oscillator
POWER SUPPLY	110-120 Volts AC RATING .3 Amp. @ 117 Volts AC



A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

4817-1

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	-15VDC§	0V.	7VAC	0V.	60VDC	60VDC	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	27KΩ	500KΩ	.1Ω	0Ω	55KΩ	50KΩ	5Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - No signal applied for voltage measurements.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Oscillator	[illegible]	6BA6	7 K	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
2	20	150	18S020	PRS150-20	BR2015	M-20-150		Filter
3	20	150	18S020	PRS150-20	BR2015	M-20-150		"
4	.02	600		684-02	DT6S2	ST-6-02	TC-12	Line Filter
5	.02	600		684-02	DT6S2	ST-6-02	TC-12	Line Isolation
6	150	500		1468-00015	5W5T15	M0.5-315	1FM-315	Osc. Grid Cap.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
7	27KΩ	½	16S011	BTS-27K	Red-Vi.-Or. Osc. Grid
8	500KΩ	½	16S020	BTS-470K	Grn.-Blk.-Yl. AF Grid
9	5000Ω	½	16S027	BTS-4700	Grn.-Blk.-Red Plate Load
10	5000Ω	½	16S027	BTS-4700	Grn.-Blk.-Red Filter
11	5000Ω	½	16S027	BTS-4700	Grn.-Blk.-Red "

R F COILS

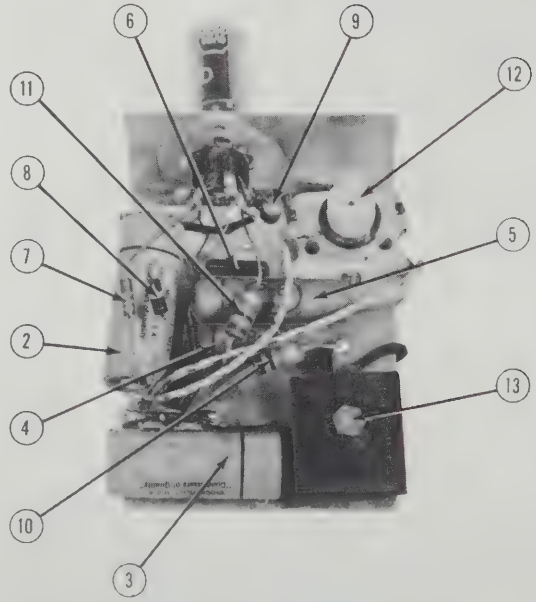
ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: MEISSNER PART No.	
12	Osc. Coil		11Ω	49S001		

MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
13	Rectifier	48S001	Selenium

CHASSIS—TOP VIEW

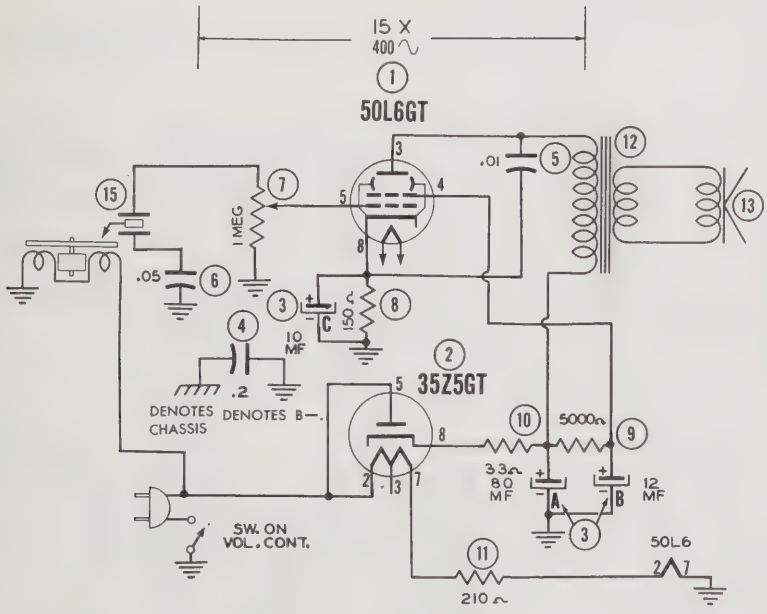
CHASSIS—BOTTOM VIEW



AIRCASTLE MODEL
7015

AIRCASTLE MODEL 7015

TRADE NAME	Aircastle, Model 7015
SUPPLIER	Spiegel Inc., 1061 W. 35th St., Chicago, Ill.
TYPE SET	AC Operated Phono Player with 2 Tube Amplifier
TUBES (TWO)	Types, 50L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC RATING .25 Amp. @ 117 Volts AC



Pin No.	50L6GT Volt.	50L6GT Res.	35Z5GT Volt.	35Z5GT Res.
1	0V.	INF.	0V.	INF.
2	50VAC	52Ω	117VAC	300Ω
3	120VDC	60KΩ	113VAC	300Ω
4	110VDC	65KΩ	0V.	INF.
5	0V.	1 Meg.	117VAC	300Ω
6	0V.	INF.	0V.	INF.
7	0V.	0Ω	85VAC	250Ω
8	7.2VDC	150Ω	130VDC	60KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

4817-2

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Power Output	50L6GT	50L6GT	7AC	
2	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: AIRCASTLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
3A	80	150	EC-9	PRSA150/40302*	E2532150*	DSB-804020-150	TA-440*	Filter-Red
B	12	150		PRS150/40			TA-212	" -White
C	10	25						Cathode Bypass-Blue
4	.2	400		484-.2	DT4P2	ST-4-2	72P3	Line Isolation
5	.01	400	PC-1	484-01	DT4S1	ST-4-01	TC-11	Output Plate Bypass
6	.05	600		684-05	DT6S5	ST-6-05	TC-15	Phono Isolation

*Parallel sections to obtain desired capacity.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
7A	1 Meg.	½	VC-3	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 7A per instructions
C	Switch		" "	41	Sw-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: AIRCASTLE PART No.	IRC PART No.	IDENTIFICATION CODES
8	150Ω	½	CR-11	BW-½-150	Br.-Grn.-Br. Output Cathode
9	5000Ω	1		BTA-5000	Grn.-Blk.-Red Filter
10	33Ω	½	CR-1	BW-½-33	Or.-Or.-Blk. Surge Limiter
11	210Ω	5	WR-1	AB-200	Line Dropping

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: AIRCASTLE PART No.	STANCOR PART No.	THORDAR'N PART No.		INSTALLATION NOTES
12	2000Ω	3.6Ω	176Ω	.6Ω	Part of SPK-11	A-3876‡	T22S45‡	A-2928‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

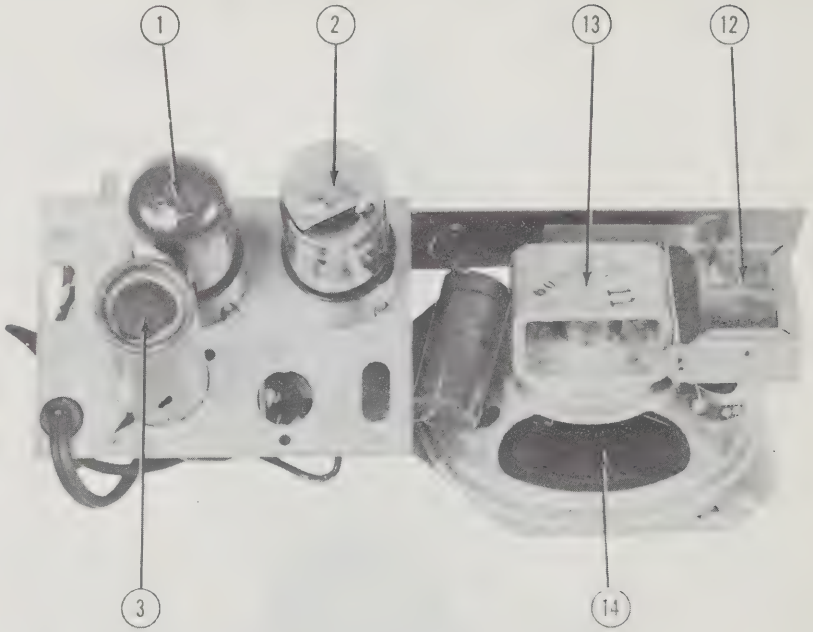
SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
13	FIELD	VC IMP.	SPK-11	ST-113‡	4A07‡	‡Trim flange.
	PM	3.6Ω		Mod. P4-X		
14	CONE DIA.	VC DIA.				
	4"	9/16"				

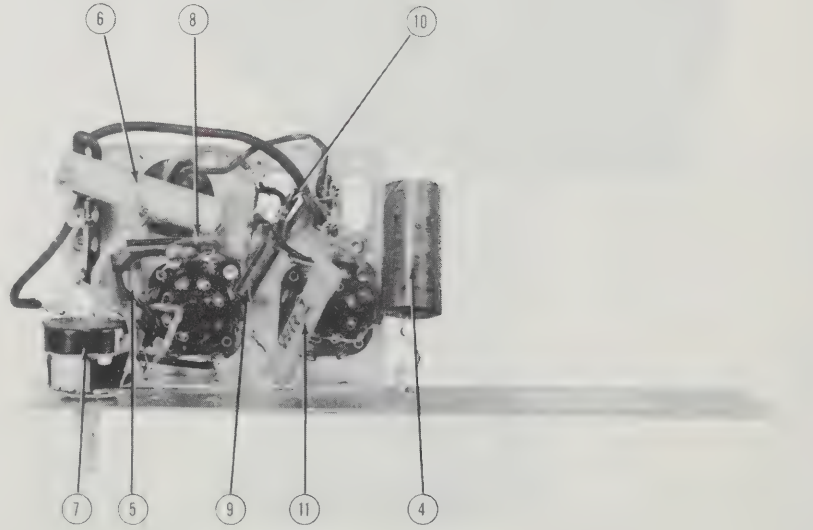
PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA: AIRCASTLE PART No.	REPLACEMENT DATA: ASTATIC PART No.	REMARKS
15		L-82A	L-82A original part.

CHASSIS—TOP VIEW



CHASSIS—BOTTOM VIEW



PHOTOFACT* Folder
*TRADE-MARK

ARVIN MODELS 241P, 244P, 2410P (Ch. RE-244, RE-254, RE-255, RE-256, RE-259) BATTERY-LINE OPERATED

ARVIN MODELS 241P, 244P, 2410P (Ch. RE-244, RE-254, RE-255, RE-256, RE-259) BATTERY-LINE OPERATED

ARVIN MODELS 241P, 244P, 2410P (Ch. RE-244, RE-254, RE-255, RE-256, RE-259) BATTERY-LINE OPERATED

ARVIN MODEL 2410P

TRADE NAME	Arvin, Models 241P, 244P, 2410P (Ch. RE-244, RE-254, RE-256, RE-259)
MANUFACTURER	Noblitt-Sparks Industries, Columbus, Indiana
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 1LB4 Power Output
POWER SUPPLY RATING	110-120 Volts AC-DC or 6 Volts "A" Supply and 67.5 Volts "B" Supply .1 Amp. @ 117 Volts AC or 55 MA @ 6 Volts DC and 7.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

There are reference holes on dial backplate. These are in order from top to bottom; low freq. end limit, 600KC, 1400KC and high freq. end limit. To set dial pointer turn tuning cap. fully closed and set top edge of dial pointer across center of low freq. calibration hole.

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD	High side to large stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMFD to reduce hum modulation.
2		Loop	1400KC	1400KC reference hole.	"	A5	Fashion loop of several turns of wire and radiate signal in-to loop of receiver. Adjust for maximum output.
3		"	"	Tune for maximum output.	"	A6	Adjust for maximum output.
4		"	600KC	"	"	A7	If sensitivity is weak bend plates of tuning cap. for maximum output. Repeat Steps 2, 3 and 4 until no further improvement can be made.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

ARVIN MODEL 5410P

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ARVIN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AV	
4	Power Output	1LB4	1LB4	7AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ARVIN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5A	20	150	A21315	AF34D20A	UP4CJ65	DY-304	EL-381	▲ Filter
B	40	150						■ "
C	100	10						Fil. Bypass
6	.05	400	C20068-503	484-05	DT4S5	ST-4-05	TC-15	Line Filter
7	.05	400	C20068-503	484-05	DT4S5	ST-4-05	72P1	Line Isolation
8	.002	600	C20069-202	684-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
9	.002	600	C20069-202	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
10	.002	600	C20069-202	684-002	DT6D2	ST-6-002	TC-22	" "
11	.01	400	C20068-103	484-01	DT4S1	ST-4-01	TC-11	AF Screen Bypass
12	.05	200	C20067-503	484-05	DT2S5	ST-4-05	TC-15	Fil. Bypass
13	.05	200	C20067-503	484-05	DT2S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
14	.05	200	C20067-503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
15	.01	400	C20068-103	484-01	DT4S1	ST-4-01	TC-11	Converter Screen Bypass
16	.05	200	C20067-503	484-05	DT4S5	ST-4-05	TC-15	Converter Fil. Bypass
17	100	500	C20065-101	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass
18	100	500	C20065-101	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
19	250	500	C20065-251	1468-00025	5W5T25	MO.5-325	1FM-325	IF Grid Filter
20	100	500	C20065-101	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
21	100	500	C20065-101	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass

CONTROLS

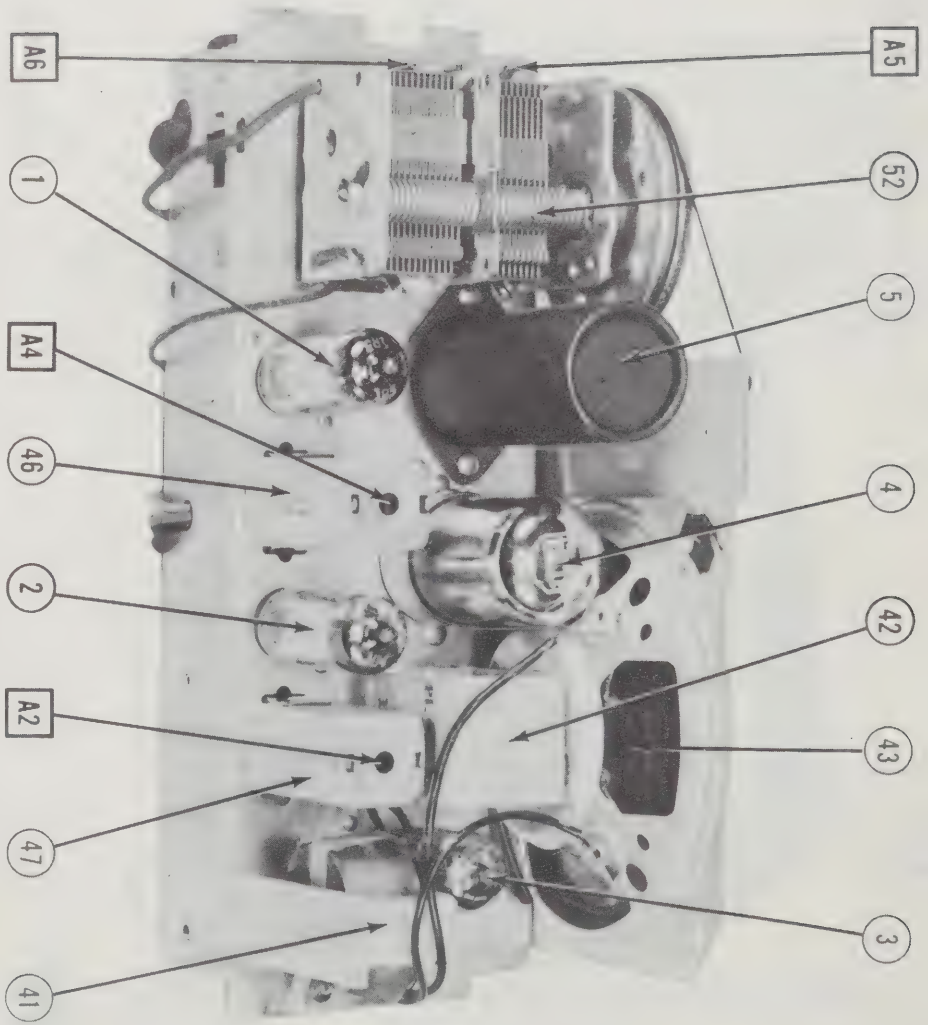
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ARVIN PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
22A	1 Meg.	½	C21782	D13-137	AT-GS-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 22A per instructions
C	Switch		" "	42	SW-A2	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ARVIN PART No.	IRC PART No.	IDENTIFICATION CODES
23	100Ω	½	C-20060-104	BTS-100K	Br.-Blk.-Yl. Osc. Grid
24	470Ω	½	C-20060-471	BTS-470	Yl.-Vi.-Br. Filament String
25	6800Ω	½	C-20060-682	BTS-6800	Blue-Gray-Red Conv. Screen
26	3.3 Meg.	½	C-20060-335	BTS-3.3 Meg.	Or.-Or.-Grn. IF Grid
27	3.3 Meg.	½	C-20060-335	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
28	4.7 Meg.	½	C-20060-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. Bias
29	10 Meg.	½	C-20060-106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
30	4.7 Meg.	½	C-20060-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
31	68KΩ	½	C-20060-683	BTS-68K	Blue-Gray-Yl. AF Plate Load
32	4.7 Meg.	½	C-20060-475	BTS-4.7 Meg.	Yl.-Vi.-Grn. Output Grid
33	10 Meg.	½	C-20060-106	BTS-10 Meg.	Br.-Blk.-Blue Feedback-See Note
34	680Ω	½	C-20060-681	BTS-680	Blue-Gray-Br. Fil. String
35	820KΩ	½	C-20060-824	BTS-820K	Gray-Red-Br. Plate
36	1-40Ω	10	A21316	A34-40	Fil. Dropping
37	2200Ω	½	C-20060-222	BTS-2200	Red-Red-Red Fil. Bleeder
38	1800Ω	1	C-20070-182	BTA-1800	Br.-Gray-Red Filter
39	68Ω	½	C-20060-680	BW-½-68	Blue-Gray-Blk. Surge Limiter
40	100Ω	1	C-20070-101	BW-1-100	Br.-Blk.-Br. Rect. Pulse

Note-Used only in early production.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA ARVIN PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
41	12KΩ	3.3Ω	280Ω	.3Ω	AC-217[illegible]-1		T22S46‡	A-2999‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA ARVIN PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
42	FIELD PM	VC IMP. 3.3Ω	C21768	ST-113* Mod. P4-X	4A15*	*Drill one new mounting hole.
43	CONE DIA. 4"	VC DIA. 9/16"				

R F COILS

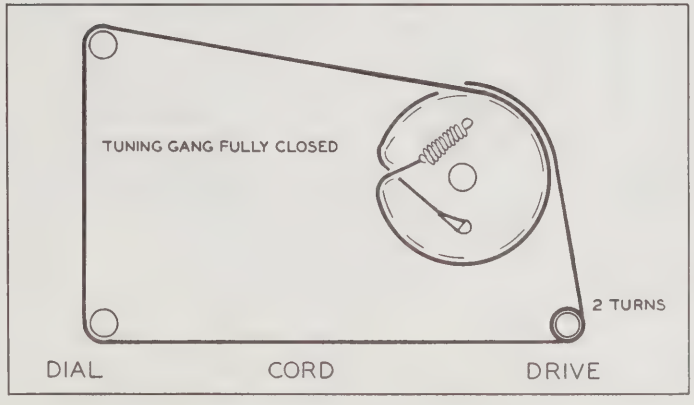
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA ARVIN PART No.	MEISSNER PART No.	
44	Loop Ant.		1.5Ω	AC21795		Specify cabinet color when ordering
45	Osc. Coil	1.7Ω	7.2Ω	AC21796-1	14-1060	
46	Input IF	25.3Ω	25.3Ω	C21797-1	16-6668	
47	Output IF	25.3Ω	24.2Ω	C27797-2	16-6668	

BATTERIES

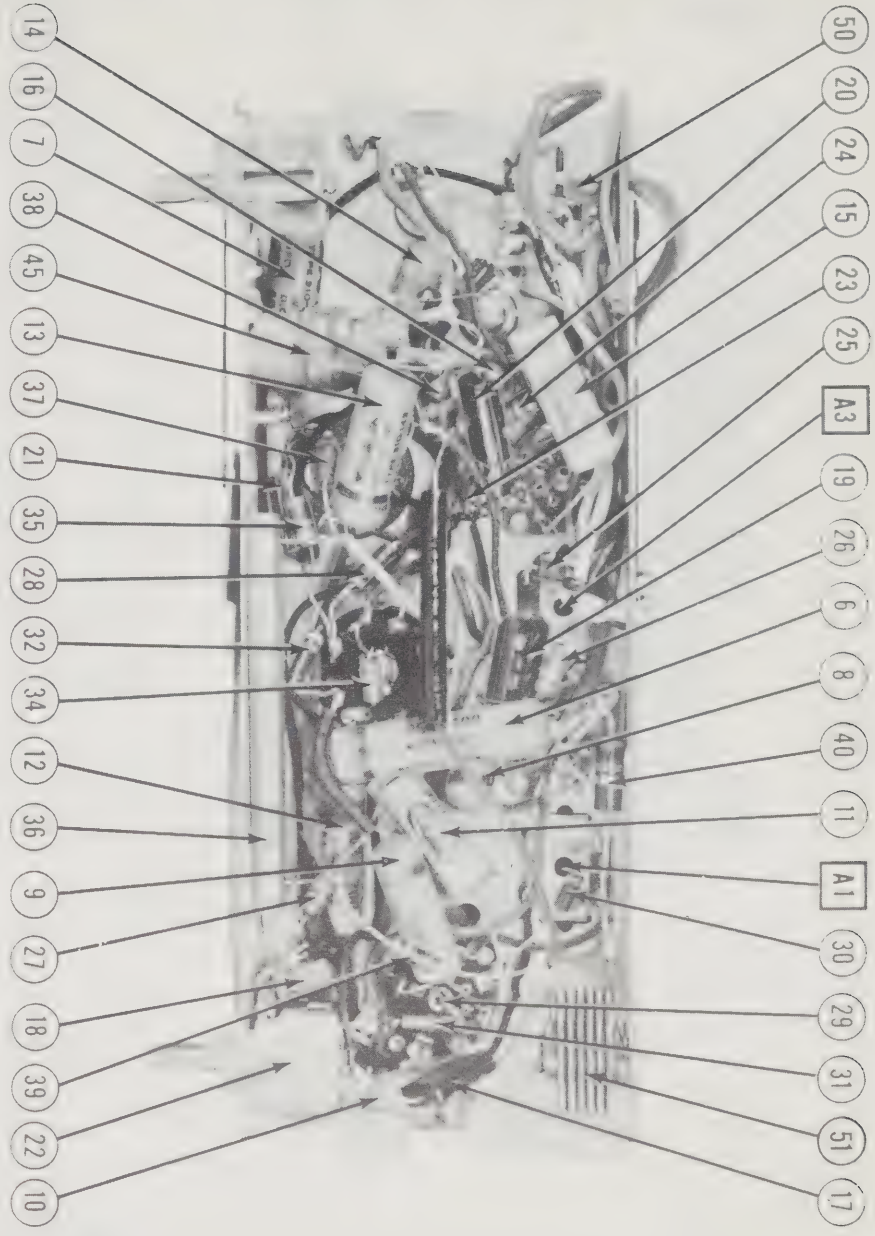
ITEM No.	VOLTAGE	ARVIN PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
48	6V "A"		950			-R			4 Used in series
49	67.5V"B"			487			XX45		

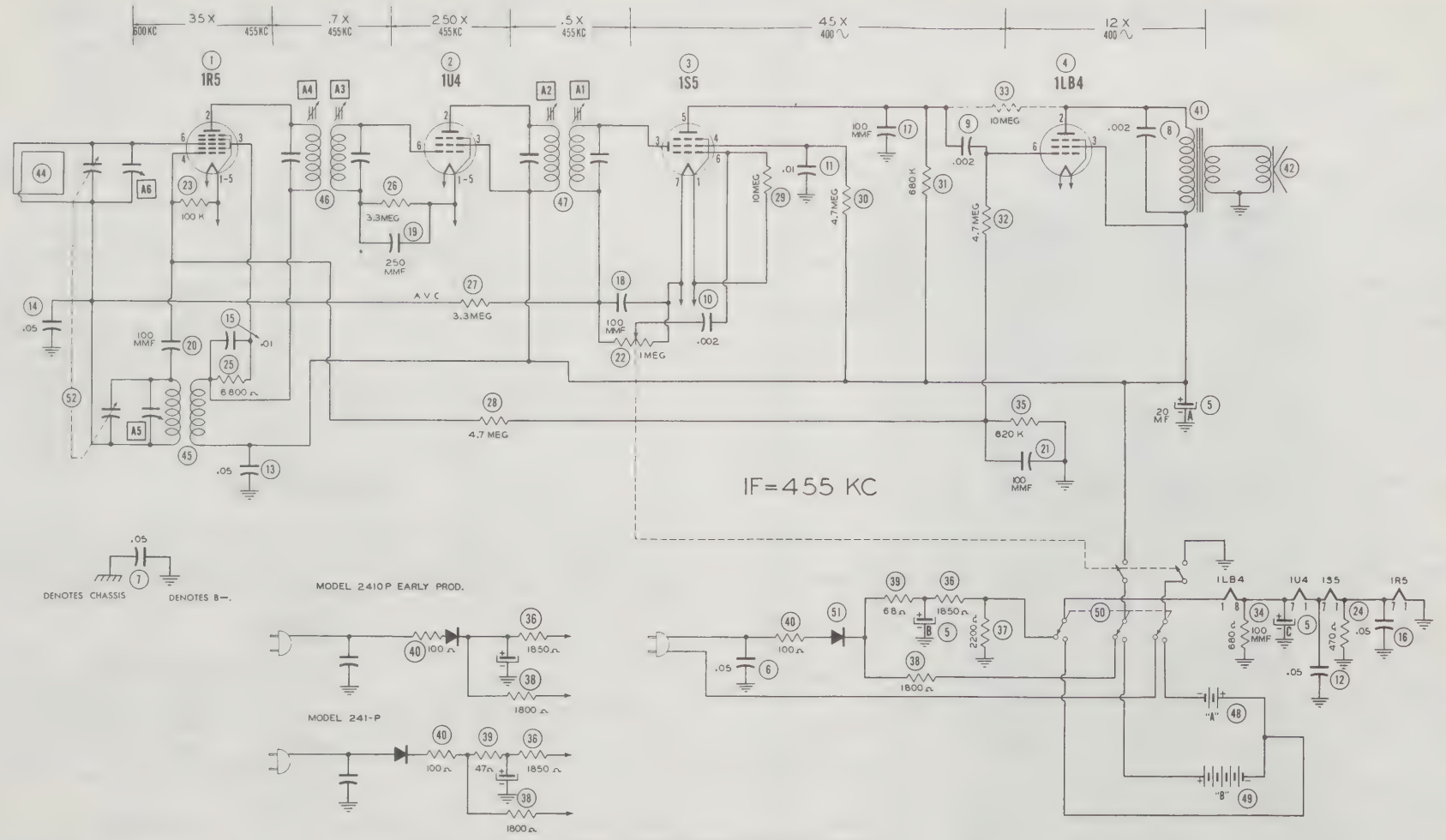
MISCELLANEOUS

ITEM No.	PART NAME	ARVIN PART No.	NOTES
50	Switch	A21051	AC/DC-Batt.
51	Rectifier	A20207-1	Selenium (75MA)
52	2 Gang Var. Cap.	C19822	(31-496MMF, 27-191MMF)
	Knob	A21764	(Specify Model & Color)
	Dial Pointer	A21783	" " " "



CHASSIS—BOTTOM VIEW





VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1R5				-16VDC§	0V.		1.4VDC	-
2	1U4			80VDC	117VAC	2.8VDC			-
3	1S5			4VDC	3.8VDC	25VDC			-
4	1LB4		80VDC	80VDC	0V.	0V.	-.1VDC		

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	1R5	"	4KΩ	4.7MΩ	1 Meg.	"	4.7 Meg.	"	-
2	1U4	"	4KΩ	4KΩ	1.3 Meg.	*	3.3 Meg.	"	-
3	1S5	*	INF.	1 Meg.	4.7 Meg.	680KΩ	10 Meg.	*	-
4	1LB4	*	4KΩ	4KΩ	5 Meg.	0Ω	5.5 Meg.	1 Meg.	"

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

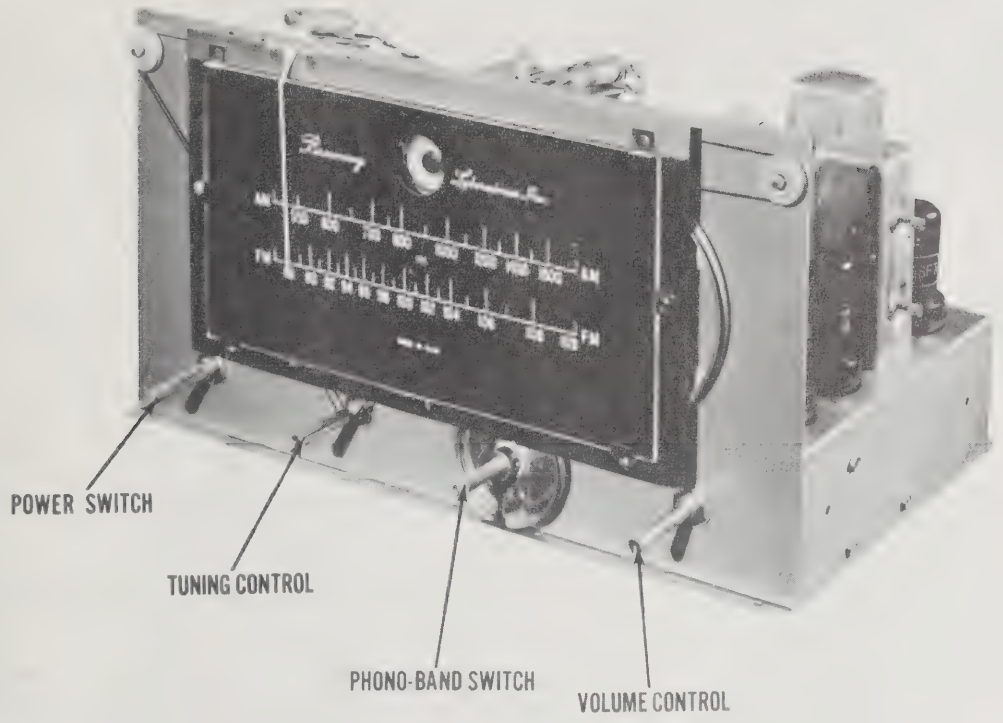
A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

4817-3

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to Pin 7 of 1S5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.



TRADE NAME	Browning, Models PF-12, RJ-12
MANUFACTURER	Browning Laboratories Inc., Winchester, Mass.
TYPE SET	AC Operated AM-FM Tuner with Power Supply (PF-12)
TUBES (THIRTEEN)	Types, 6SG7 AM RF Amp., 6SA7 AM Converter, 6BA6 FM RF Amp., 6BE6 FM Mixer, 6C4 FM Osc., 7AG7 1st FM IF Amp., 7AG7 2nd FM IF Amp., 6SF7 AM IF-Det.-AVC, 6U5/6G5 Tuning Eye, 6SJ7 1st FM Limiter, 6SJ7 2nd FM Limiter, 6H6 FM Discrim., 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC — RATING .69 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1650KC — FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ▲LIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.
Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

If a VTVM is not available a 20000Ω per volt DC voltmeter may be used.
Attenuate output of sig. gen. to maintain maximum meter reading of one volt.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	.01 MFD.	High side to center stator of AM tuning cap. Low side to chassis.	456KC	AM	Tuning cap. fully open.	DC probe to Point (A) .Common to chassis	A1,A2, A3,A4	Adjust for maximum deflection.
2	200MMFD	High side to either ant. terminal. Low side to chassis.	600KC	"	600KC	"	A5	"
3	200MMFD	"	1500KC	"	1500KC	"	A6	Adjust for maximum deflection. Repeat Steps 2 and 3 until no further improvement can be made.
4	200MMFD	"	"	"	Tune for maximum deflection.	"	A7,A8	Adjust for maximum deflection.
5	200MMFD	"	456KC	"	Tuning cap. fully open.	"	A9	Adjust for minimum deflection.

FOR FM ALIGNMENT SEE PAGE 2 OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

BROWNING MODELS
PF-12, RJ-12

BROWNING MODELS
PF-12, RJ-12

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use a frequency modulated signal with 60 ∿ modulation & 450KC sweep. Connect the synchronized sweep voltage from the signal generator to the horizontal input of scope. The horizontal sweep voltage may be taken from the power line if signal generator does not have a synchronizing voltage output. There may be some phase shift encountered between signal generator and scope horizontal sweep. If provision is made for this in the scope rotate phase control until the two curves coincide. If no provision is made for this the same thing may be accomplished by inserting a cap. of suitable value (.01 to .1 MFD) in series with the horizontal synchronizing input.

To provide marker pip for correct alignment use an accurately calibrated AM signal generator set to 8.25MC. Use a small mica condenser in series with AM signal generator output and connect in parallel with the FM sig. generator. In all cases adjust FM sig. generator so that marker pip is at center of scope horizontal sweep line. Attenuate output of AM sig. gen. so that marker pip is just visible.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
6	.01 MFD	High side to Pin 6 (grid) of 7AG7 1st IF Tube (6). Low side to chassis. (See prealignment notes).	8.25MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point ⏀. Ground to chassis.	A10, A11 A12, A13	Adjust for maximum amplitude and symmetry on either side of marker pip of pattern per Fig. 1.
7	.01 MFD	High side to center stator of FM tuning cap. Low side to chassis.	"	"	"	"	A14, A15	"
8	.01 MFD	High side to Pin 6 (grid) of 7AG7 1st IF Tube (6). Low side to chassis. (See prealignment notes).	"	"	"	Vertical input to Point ⏀. Ground to chassis.	A16, A17	Alternately adjust A16 for maximum amplitude & A17 for maximum straightness of "S" curve and centering of "S" curve about marker pip of pattern per Fig. 2. Continue with FM-RF Alignment in Step 11.

FM RF ALIGNMENT

Attenuate output of signal generator to maintain VTVM reading of 1 to 2 volts.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
11	2-150Ω carbon res.	Each side in series with 150Ω resistor to ant. terminals.	108MC	FM	108MC	DC probe to Point ⏀. Common to chassis	A18	Adjust for maximum deflection.
12	"	"	90MC	"	90MC	"	FM Osc. Coil (111)	With a non-conducting rod compress or expand osc. coil slightly for maximum deflection. Repeat Steps 11 & 12 until no further improvement can be made.
13	"	"	108MC	"	Tune for maximum deflection.	"	A19	Rock tuning cap. and adjust for maximum deflection.
14	"	"	90MC	"	"	"	FM RF Coil (109)	With a non-conducting rod compress or expand RF coil slightly for maximum deflection. Repeat Steps 13 and 14 until no further improvement can be made.
15	"	"	108MC	"	"	"	A20	Rock tuning cap. and adjust for maximum deflection.

FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

For plotting IF curve, vary signal gen. 150KC above and below 8.25MC in steps of 20KC. Record readings of VTVM for each setting of sig. gen. and plot curve. If curve is not similar to Fig. 1 repeat last two adjustments and replot curve.

For plotting discriminator curve vary signal generator 100KC above and below 8.25MC in Steps of 20KC. Record readings of VTVM for each setting of signal generator and plot curve. If curve is not similar to Fig. 2 repeat adjustment of A16 and A17 and replot curve.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
6	.01 MFD	High side to Pin 6 (grid) of 7AG7 2nd IF Tube (7). Low side to chassis.	8.25MC (Unmodulated)	FM	Tuning cap. fully open.	DC probe to Point ⏀. Common to chassis	A10, A11	Solder a shunt cap. of 10 MMFD across secondary of 3rd FM IF Transformer (116). Adjust A10 for maximum deflection. Transfer shunting cap. to primary of same transformer and adjust A11 for maximum deflection. Plot IF curve per prealignment instructions. Once curve is satisfactory do not disturb adjustment of A10 & A11. Remove shunt cap.
7	.01 MFD	High side to Pin 6 (grid) of 7AG7 1st IF Tube (6). Low side to chassis.	"	"	"	"	A12, A13	Solder a shunt cap. of 10MFD across secondary of 2nd FM IF Transformer (115). Adjust A12 for maximum deflection. Transfer shunting cap. to primary of same transformer and adjust A13 for maximum deflection. Plot IF curve per prealignment instructions. Once curve is satisfactory do not disturb adjustment of A12 & A13. Remove shunt cap.
8	.01 MFD	High side to center stator of FM tuning cap. Low side to chassis.	"	"	"	"	A14, A15	Solder a shunt cap. of 10 MMFD across secondary of 1st FM IF transformer (113). Adjust A14 for maximum deflection. Transfer shunting cap. to primary of same transformer and adjust A15 for maximum deflection. Plot IF curve per prealignment instructions. Once curve is satisfactory do not disturb adjustment of A12 and A13. Remove shunt cap.
9	.01 MFD	High side to Pin 4 (grid) of 6SJ7 1st Limiter (10). Low side to chassis.	"	"	"	DC probe to Point ⏀. Common to chassis	A16	Adjust for maximum deflection.
10	.01 MFD	"	"	"	"	DC probe to Point ⏀. Common to chassis	A17	Adjust for zero deflection. Plot discriminator curve per prealignment instructions. Continue with FM-RF Alignment in Step 11.

FIG. 1

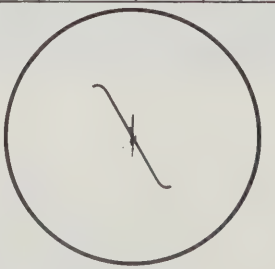


FIG. 2

85
35
90
89
30
47
91
118
84
88
87
31
59
32
86
83
33
49
82
34
48
126
80
29
28
B
92
36
93
46
94
57
111
45
119
A18
95
44
97
58
96
43
27
98
D
99
37
C
101
42
A
72
40
68
17
71
74
70
18
69
19
123
51
50
53
79
78
81
56
52
54
55
109
A20
107
16
A19
75
A9
100
38
41
73
122
105
77
15
61
106
26
24
60
25
20
67
21
110
66
23
64
22
63
65
108
39
62

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		BROWNING PART No.	STANDARD REPLACEMENT		
1	AM RF Amp.	6SG7	6SG7	9BK	
2	AM Converter	6SA7	6SA7	6R	
3	FM RF Amp.	6BA6	6BA6	7BK	
4	FM Mixer	6BE6	6BE6	7CH	
5	FM Osc.	6C4	6C4	9HG	
6	1st FM IF Amp.	7AG7	7AG7		
7	2nd " " "	7AG7	7AG7		
8	AM IF Det.-AVC	6SF7	6SF7	7AZ	
9	Tuning Eye	6U5/6G5	6U5/6G5	6R	
10	1st FM Limiter	6SJ7	6SJ7	7CN	
11	2nd FM Limiter	6SJ7	6SJ7	7CN	
12	FM Discrim.	6H6	6H6	7AL	
13	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	BROWNING PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
14A	40	450		AF38J	UP4445	DY-2x40-450	EL-240	◘ Filter
B	40	450						◓ "
15	.05	600		684-05	DT6S5	ST-6-05	TC-15	Audio Coupling
16	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Tuning Eye Grid Bypass
17	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
18	.01	600		684-01	DT6S1	ST-6-01	TC-11	AM IF Plate Decoupling
19	.01	600		684-01	DT6S1	ST-6-01	TC-11	AM IF Cathode Bypass
20	.01	600		684-01	DT6S1	ST-6-01	TC-11	AM IF Screen Bypass
21	.01	600		684-01	DT6S1	ST-6-01	TC-11	AVC Filter
22	.01	600		684-01	DT6S1	ST-6-01	TC-11	Converter Plate Decoup.
23	.01	600		684-01	DT6S1	ST-6-01	TC-11	Converter Screen Bypass
24	.01	600		684-01	DT6S1	ST-6-01	TC-11	AM RF Screen Bypass
25	.01	600		684-01	DT6S1	ST-6-01	TC-11	AM RF Cathode Bypass
26	.05	600		684-05	DT6S5	ST-6-05	TC-15	AVC Filter
27	.005	600		684-005	DT6D5	ST-6-005	TC-25	2nd Limiter Plate Decoup.
28	.005	600		684-005	DT6D5	ST-6-005	TC-25	2nd IF Plate Decoup.
29	.005	600		684-005	DT6D5	ST-6-005	TC-25	2nd IF Screen Bypass
30	.005	600		684-005	DT6D5	ST-6-005	TC-25	2nd IF Cathode Bypass
31	.005	600		684-005	DT6D5	ST-6-005	TC-25	1st IF Plate Decoup.
32	.005	600		684-005	DT6D5	ST-6-005	TC-25	1st IF Screen Bypass
33	.005	600		684-005	DT6D5	ST-6-005	TC-25	1st IF Cathode Bypass
34	.005	600		684-005	DT6D5	ST-6-005	TC-25	Mixer Plate Decoup.
35	.005	600		684-005	DT6D5	ST-6-005	TC-25	FM Osc. Plate Decoup.
36	.005	600		684-005	DT6D5	ST-6-005	TC-25	RF Bypass Pwr. Supply-Note
37	.005	600		684-005	DT6D5	ST-6-005	TC-25	Filament Bypass-Note
38	270	500		1468-00025	5W5T25	MO.5-325	1FM1-325	RF Bypass
39	50	300		1469-00005	5R5Q5	MOS.5-45	MS-45	AM Osc. Grid Cap.-Cer.
40	5	300		1469-000005	5R5V5	MOS.5-55	MS-55	Fixed Trimmer-Cer.*
41	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	De-emphasis
42	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	RF Bypass
43	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	2nd Limiter Screen Bypass
44	25	500		1468-000025	5W5Q25	MO.5-425	1FM-425	IF Coupling
45	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	1st Limiter Screen Bypass
46	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	1st Limiter Grid Filter
47	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	2nd IF Grid Filter
48	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	Mixer Screen Bypass
49	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	Mixer Filament Bypass
50	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling
51	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	RF Screen Bypass
52	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	RF Filament Bypass
53	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	RF Cathode Bypass
54	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling
55	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Coupling
56	5	300		1469-000005	5R5V5	MOS.5-55	MS-55	FM Osc. Feedback-Cer.
57	470	300						Fixed Padder-Cer.
58	1000	500		1468-001	1W5D1	MW.5-21	1FM-21	Osc. Plate Decoup.
59	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	FM Osc. Grid Cap.

Note-Not used on all models.

PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	BROWNING PART No.	MEISSNER PART No.	
105	Wave Trap		30.1Ω			
106	BC Ant.Coil	21.2Ω	4.3Ω		14-1056	
107	FM " "	0Ω	0Ω			
108	BC RF Coil	111Ω	3.6Ω		14-1057	
109	FM " "		0Ω			
110	BC Osc. "	2Ω	7.8Ω		14-1060	
111	FM " "		0Ω			
112	AM Input IF	15.8Ω	11.6Ω			
113	FM 1st IF	.3Ω	.3Ω			
114	AM Output IF	14.2Ω				
115	FM 2nd IF	.3Ω	.3Ω			
116	FM 3rd IF	.3Ω	.3Ω			
117	Disc. Trans.	1.1Ω	1.6Ω			
118	FM Osc.Cath. Coil		.3Ω			
119	RF Choke		.3Ω			
120	FM RF Plate Choke		0Ω			

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					BROWNING PART No.		
120	Bayonet	6-8	0.15	Brown			Type 47
121	"	6-8	0.15	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	BROWNING PART No.	NOTES
122	Switch		Band-Phono
123	"		On-Off (Power)
124	AM Tuning Gang		(35-390MMF) each section
125	FM " "		

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

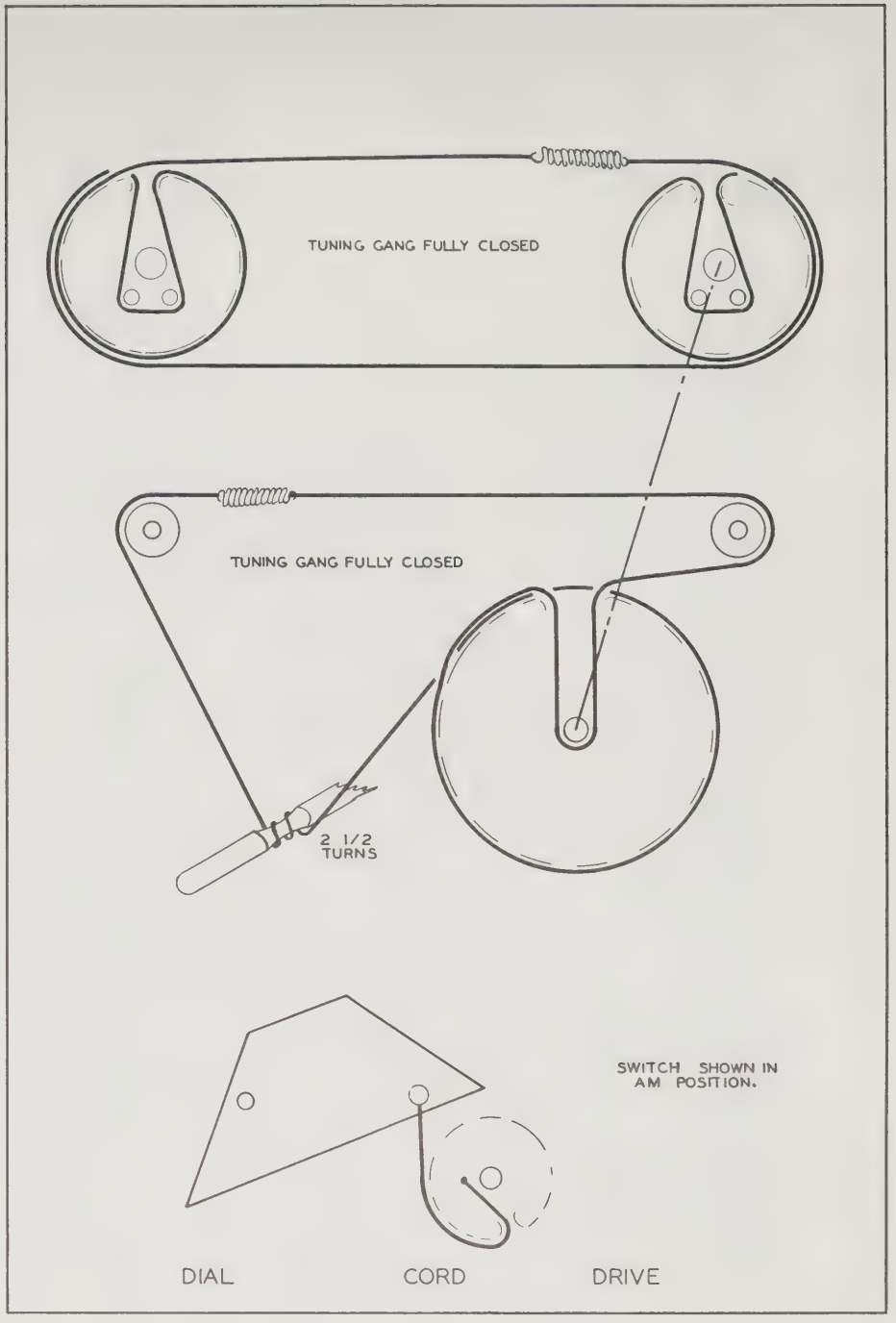
ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	BROWNING PART No.	IRC PART No.	CLAROSTAT PART No.	
60A	250KΩ	½		D13-130	M-64-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 58A per instructions

RESISTORS

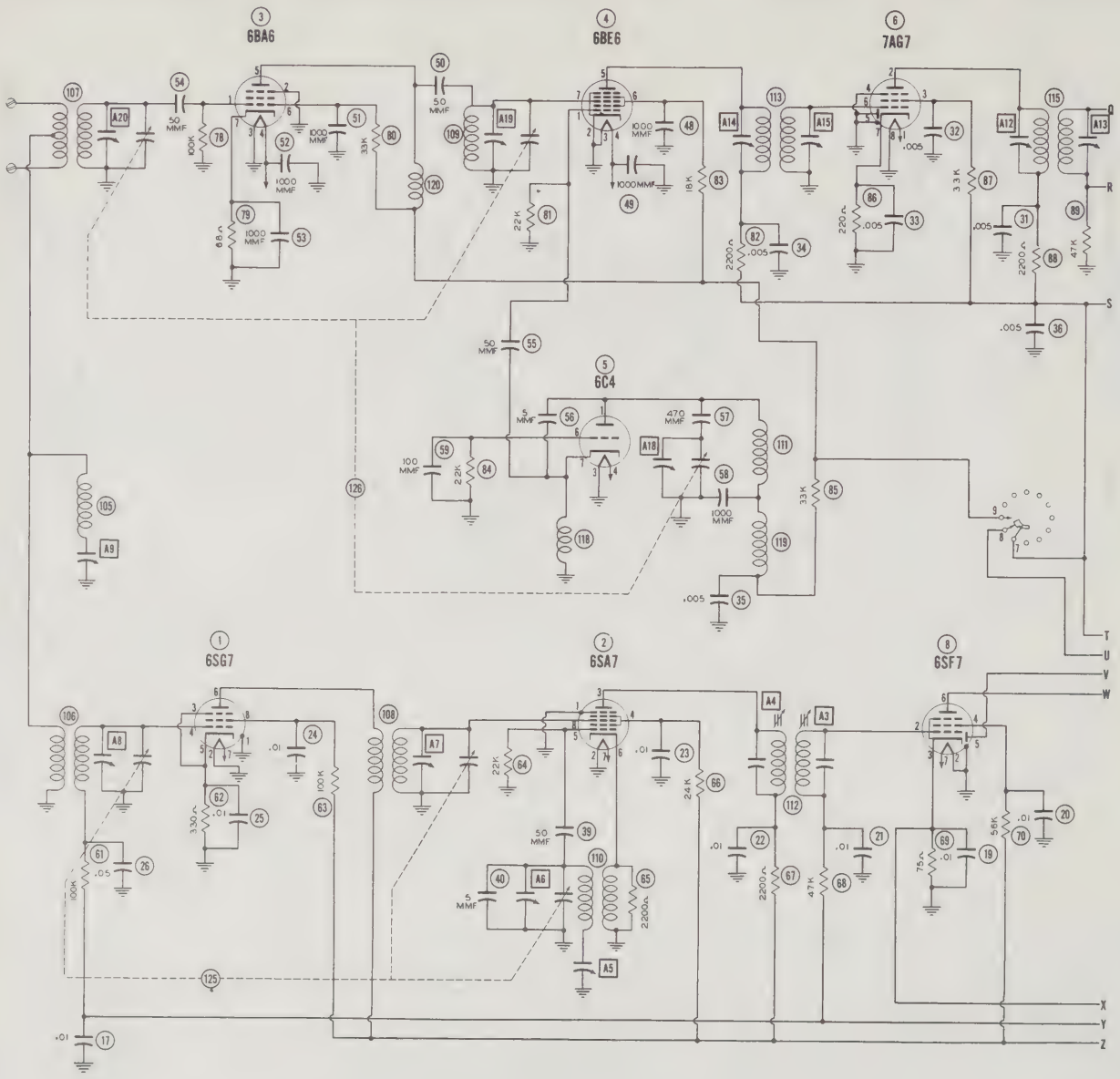
ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	BROWNING PART No.	IRC PART No.	
61	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AVC Network
62	330Ω	½		BW-½-330	Or.-Or.-Br. AM RF Cathode
63	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AM RF Screen
64	22KΩ	½		BTS-22K	Red-Red-Or. AM Osc. Grid
65	2200Ω	½		BTS-2200	Red-Red-Red AM Osc. Coil Shunt
66	24KΩ	1		BTA-22K	Red-Yl.-Or. Conv. Screen
67	2200Ω	½		BTS-2200	Red-Red-Red Conv. Plate Decoup.
68	47KΩ	½		BTS-47K	Yl.-Vi.-Or. AVC Network
69	75Ω	½		BW-½-68	Vi.-Grn.-Blk. AM IF Cathode
70	56KΩ	½		BTS-56K	Grn.-Blue-Or. AM IF Screen
71	2200Ω	½		BTS-2200	Red-Red-Red AM IF Plate Decoup.
72	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
73	390KΩ	½		BTS-390K	Or.-White-Yl. Diode Load
74	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " "
75	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Tuning Eye Grid
76	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Eye Plate Load
77	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AVC Network
78	100KΩ	½		BTS-100K	Br.-Blk.-Yl. FM RF Grid
79	68Ω	½			Blue-Gray-Blk. FM RF Cathode
80	33KΩ	1		BTA-33K	Or.-Or.-Or. FM RF Screen
81	22KΩ	½		BTS-22K	Red-Red-Or. Mixer Injector Grid
82	2200Ω	½		BTS-2200	Red-Red-Red Mixer Plate Decoup.
83	15KΩ	2		BT-2-15K	Br.-Gray-Or. Mixer Screen
84	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
85	33KΩ	½		BTA-33K	Or.-Or.-Or. FM Osc. Plate Decoup.
86	220Ω	½			Red-Red-Br. 1st FM IF Cathode
87	33KΩ	1		BTA-33K	Or.-Or.-Or. 1st FM IF Screen
88	2200Ω	½		BTS-2200	Red-Red-Red 1st FM IF Plate Decoup.
89	47KΩ	½		BTS-47K	Yl.-Vi.-Or. FM 2nd IF Grid
90	220Ω	½			Red-Red-Br. FM 2nd IF Cathode
91	33KΩ	1		BTA-33K	Or.-Or.-Or. FM 2nd IF Screen
92	2200Ω	½		BTS-2200	Red-Red-Red FM 2nd IF Plate Decoup.
93	47KΩ	½		BTS-47K	Yl.-Vi.-Or. 1st Limiter Grid
94	100KΩ	1		BTA-100K	Br.-Blk.-Yl. 1st Limiter Screen
95	10KΩ	½		BTS-10K	Br.-Blk.-Or. 1st Limiter Plate Load
96	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd Limiter Grid
97	100KΩ	1		BTA-100K	Br.-Blk.-Yl. 2nd Limiter Screen
98	27KΩ	½		BTS-27K	Red-Vi.-Or. 2nd Limiter Plate Decoup.
99	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Disc. Diode Load
100	10KΩ	½		BTS-100K	Br.-Blk.-Yl. " " "
101	100KΩ	½		BTS-100K	Br.-Blk.-Yl. De-emphasis
102	200Ω	10		AB-200	Sure Limiter
103	20000Ω	2		CBA-2	Filter

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	BROWNING PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
104	117V AC @ .69A	720V CT .065A DC	5.3V AC @ 2.0A	6.3V AC @ 3.3A	14255	P-949	T22R05	P-2053



DATE 10/48-#4817-4 SET #47-FOLDER #4



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	[illegible]	[illegible]	[illegible]	3VDC	.1VDC	[illegible]	1[illegible]VDC	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	250VDC	[illegible]	-[illegible]VDC	[illegible]	[illegible]	[illegible]
‡ 3	[illegible]	[illegible]	[illegible]	0V.	[illegible]	[illegible]	[illegible]	[illegible]	-
‡ 4	[illegible]	[illegible]	[illegible]	0V.	[illegible]	[illegible]	[illegible]	[illegible]	-
‡ 5	[illegible]	[illegible]	-	[illegible]	[illegible]	-	-[illegible]VDC	[illegible]	-
‡ 6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
‡ 7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	.1VDC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	-	-	-	-	-	-	-	-
‡ 10	[illegible]	[illegible]	[illegible]	[illegible]	-.5VDC	0V.	80VDC	6.6VAC	200VDC
‡ 11	[illegible]	[illegible]	[illegible]	0V.	-.5VDC	0V.	100VDC	6.6VAC	80VDC
‡ 12	[illegible]	[illegible]	[illegible]	-.4VDC	-.4VDC	-5VDC	-.8VDC	6.4VAC	0V.
13	[illegible]	[illegible]	[illegible]	0V.	360VAC	0V.	360VAC	0V.	410VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA7	0Ω	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
‡ 3	[illegible]	1 MΩ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
‡ 4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-
‡ 5	[illegible]	[illegible]	-	[illegible]	[illegible]	-	[illegible]	[illegible]	-
‡ 6	[illegible]	[illegible]	52KΩ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
‡ 7	[illegible]	[illegible]	52KΩ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8	[illegible]	[illegible]	600KΩ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
9	[illegible]	-	-	-	-	-	-	-	-
‡ 10	6BJ7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
‡ 11	6BJ7	0Ω	0Ω	0Ω	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
‡ 12	6H6	0Ω	0Ω	200KΩ	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
13	5Y3GT	INF.	50KΩ	INF.	[illegible]	INF.	1120Ω	[illegible]	[illegible]

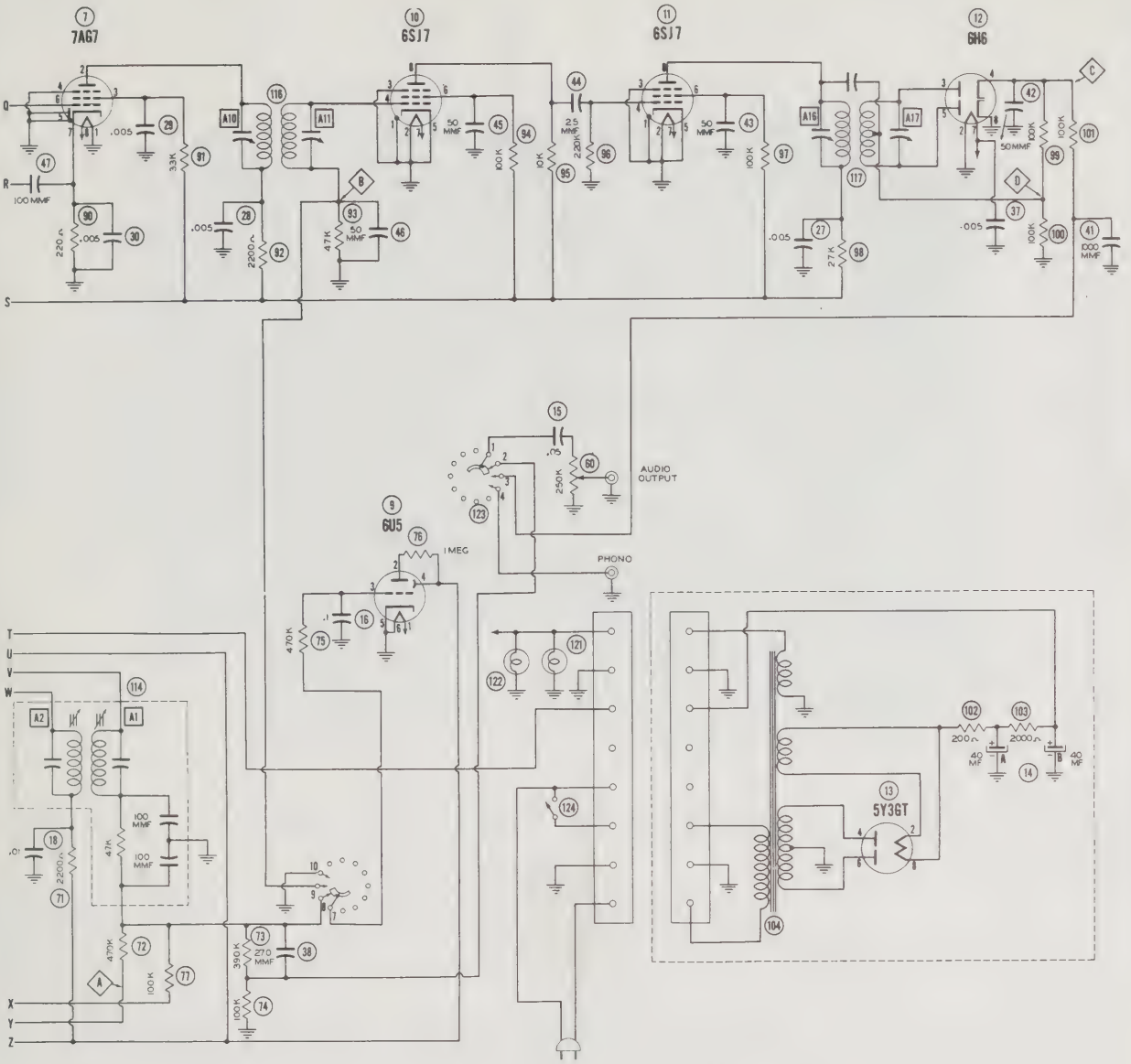
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

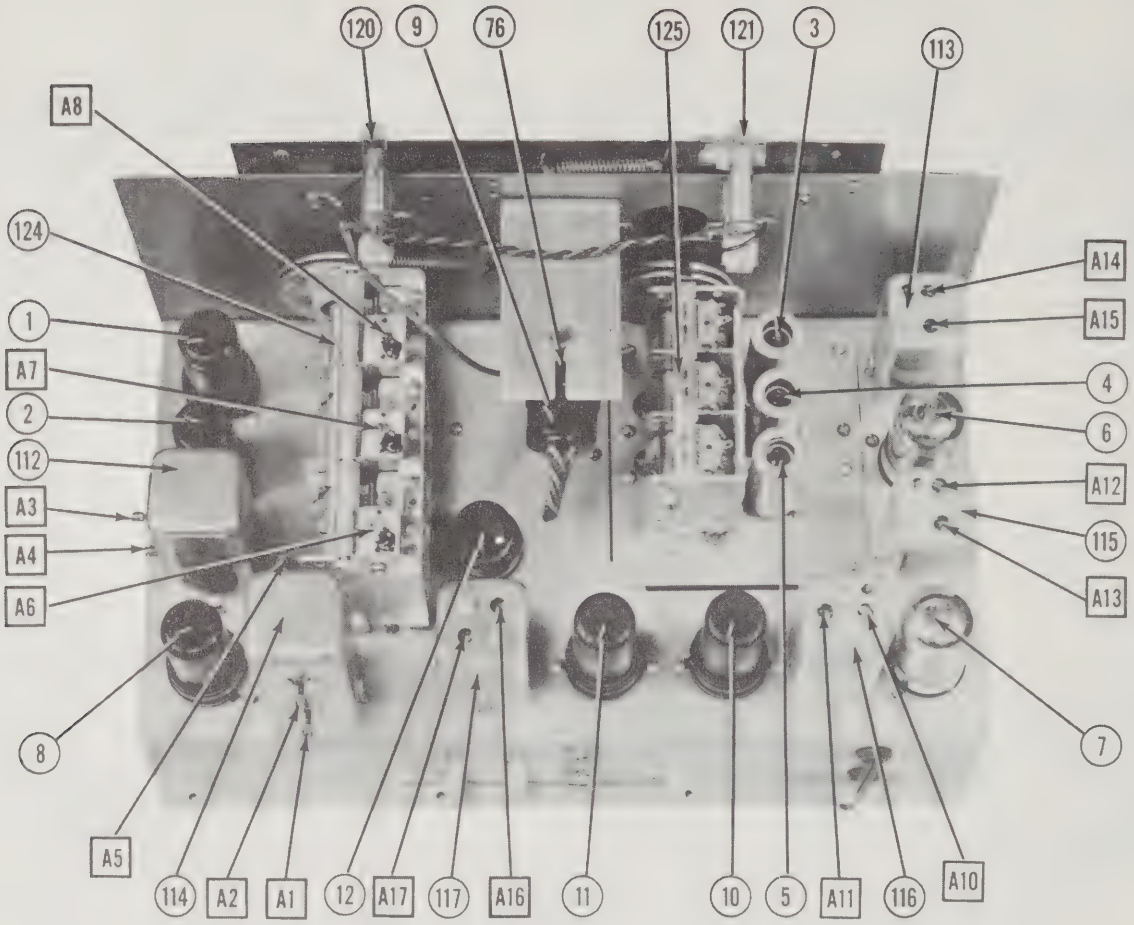


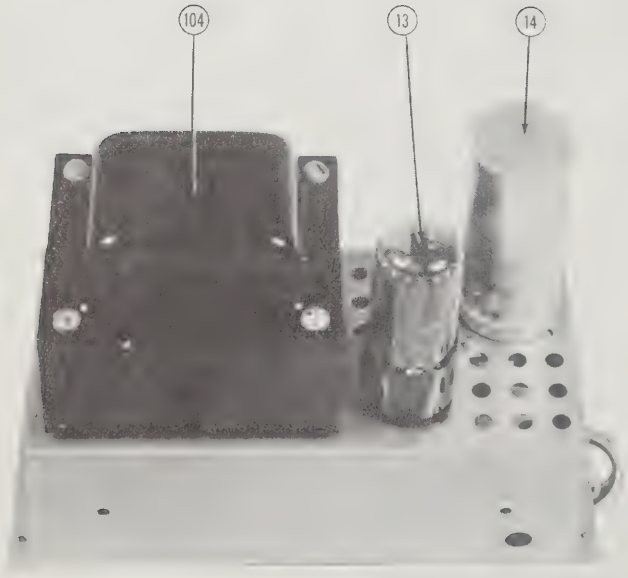
STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	10X	[illegible]
RF GRID TO CONV. GRID	10X	[illegible]
CONVERSION GAIN	10X	[illegible]
INPUT IF TRANSFORMER	1.[illegible]X	456KC
IF TUBE	[illegible]A	[illegible]
OUTPUT IF TRANSFORMER	1.[illegible]	456KC

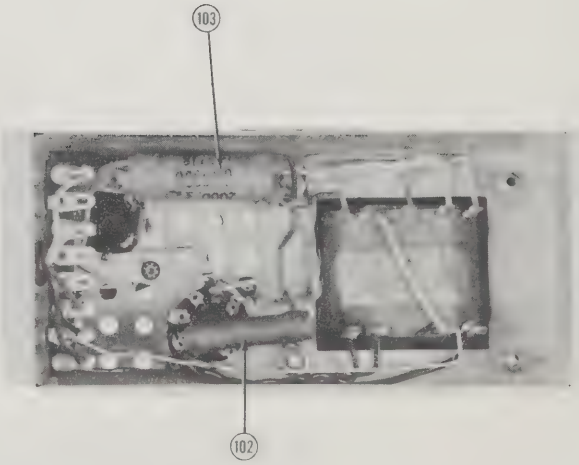
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

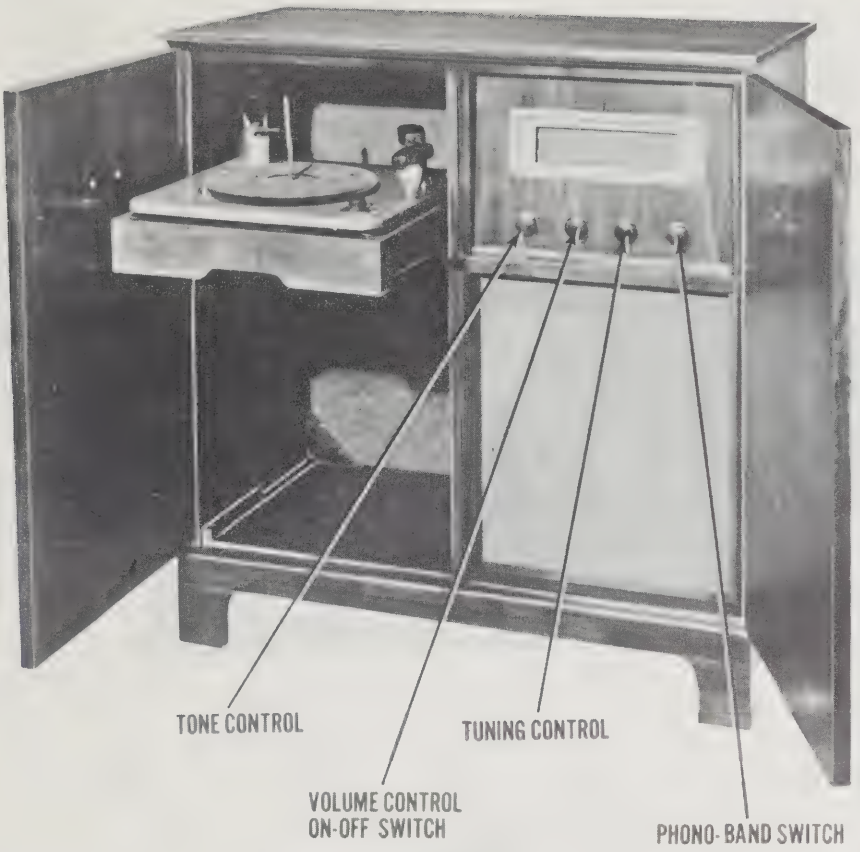
©Howard W. Sams & Co., Inc. 1948


120
9
76
125
121
3
113
A8
124
1
A7
2
112
A3
A4
A6
A14
A15
4
6
A12
115
A13
7
8
A5
114
A2
A1
12
A17
117
A16
11
10
5
A11
116
A10


104
13
14


103
102

CORONADO MODEL
43-7851



CORONADO MODEL
43-7851

CORONADO MODEL 43-7851

TRADE NAME	Coronado, Model 43-7851
MANUFACTURER	Gamble-Skogmo, Inc., 15 N. 8th St., Minneapolis, Minn.
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver
TUBES (SEVEN)	Types, 6BE6 AM-FM Conv., 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 Ratio Detector, 6AV6 AM Det.-AF, 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC — RATING .5 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — SHORT WAVE 88 - 108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use insulated alignment screwdriver for all adjustments.
Allow receiver and sig. gen. to warm up for at least fifteen minutes before attempting alignment.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 1 (grid) of 6BA6 1st IF Tube (2). Low side to chassis.	455KC	BC (Center position)	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output.
2	.1 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	"	"	"	"	A3,A4	" " " "
3	.1 MFD	"	1620KC	"	"	"	A5	" " " "
4	30 MFD	High side to ext. ant. lead. Low side to chassis.	1400KC	"	Tune for max. output.	"	A6	Adjust for maximum output. Set dial pointer to 1400 KC calibration mark.

FOR FM ALIGNMENT SEE PAGE FOUR OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. • 2924 East Washington Street • Indianapolis 7, Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 10/48-#4817-5 SET #47-FOLDER #5

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CORONADO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	AM-FM Conv.	6BE6	6BE6	7CH	
2	1st IF Amp.	6BA6	6BA6	7BK	
3	2nd IF Amp.	6BA6	6BA6	7BK	
4	Ratio Detector	6AL5	6AL5	6BT	
5	AM Det.-AF	6AV6	6AV6		
6	Power Output	6V6GT	6V6GT	7AC	
7	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CORONADO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	40	350	45X359		UP43145C#	DY-406	EL424#	● Filter
B	40	350			BR2045		UT203	■ "
C	20	350						▲ "
D	20	25						Cathode Bypass
9	5	100	45X361	PRS150/4	BR415	M-4-450	UT-41	Stabilizing Cap.
10	.001	800	H66102	1084-001	MD16D1	STM-16-001	TR-21	Output Plate Bypass
11	.004	200	B66402	484-004	DT6D4	ST-6-004	TC-24	Tone Comp.
12	.02	400	D66203	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
13	.005	400	D66502	484-005	DT6D5	ST-6-005	TC-25	" "
14	.04	200	B66403	484-04	DT4S4	ST-6-04	TC-14	Tone Comp.
15	.01	400	D66103	484-01	DT4S1	ST-4-01	TC-11	Conv. Screen Decoup.
16	.05	200	B66503	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
17	220	300	47X268	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass-Cer.
18	68	500	47X471	1469-00007	5W5Q7	MOS.5-47	MS-47	Tone Comp.
19	470	500	47X510	1469-0005	5R5T5	MOS.5-35	MS-35	Ratio Det. Diode Load Cap.
20	2700	500	47X492	1467-0025	1W5D25	MW.5-225	1FM-23	De-emphasis
21	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Decoupling-Cer.
22	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	2nd IF Cathode Byp.-Cer.
23A	50	300	*	1469-00005	5R5Q5	MOS.5-45	MS-45	AM Diode Filter
B	50	300	*	1469-00005	5R5Q5	MOS.5-45	MS-45	" " "
24	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	1st IF Decoupling-Cer.
25	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	1st IF Cath. Byp.-Cer.
26	5000	300	47X507	1467-005	1D5D5	MW.5-25	1FM-25	Conv. Plate Decoupling
27	47	500	47X463	1468-00005	5W5Q5	MO.5-45	1FM-45	Conv. Screen Bypass
28	10	300	47X512	1468-00001	5W5Q1	MO.5-41	1FM-41	Fixed Trimmer-Cer.
29	47	500	47X517	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
30	12	300	47X522					Fixed Trimmer-Cer.
31	10	300	47X523	1469-00001	5R5Q1	MOS.5-41	MS-41	" " "
32	100	300	47X511	1469-0001	5R5T1	MOS.5-31	MS-31	Fixed Padder-Cer.
33	500	300	47X508	1468-0005	5W5T5	MO.5-35	1FM-35	Filament Bypass-Cer.
34	6	300	47X521					Fixed Trimmer-Cer.
35	100	500	47X476	1468-0001	5W5T1	MO.5-31	1FM-31	Line Ant. Coupling

*Item #23A & B and 45 are combined in one unit and may be obtained under Part No. 76X1.
#Parallel sections to obtain desired capacity.

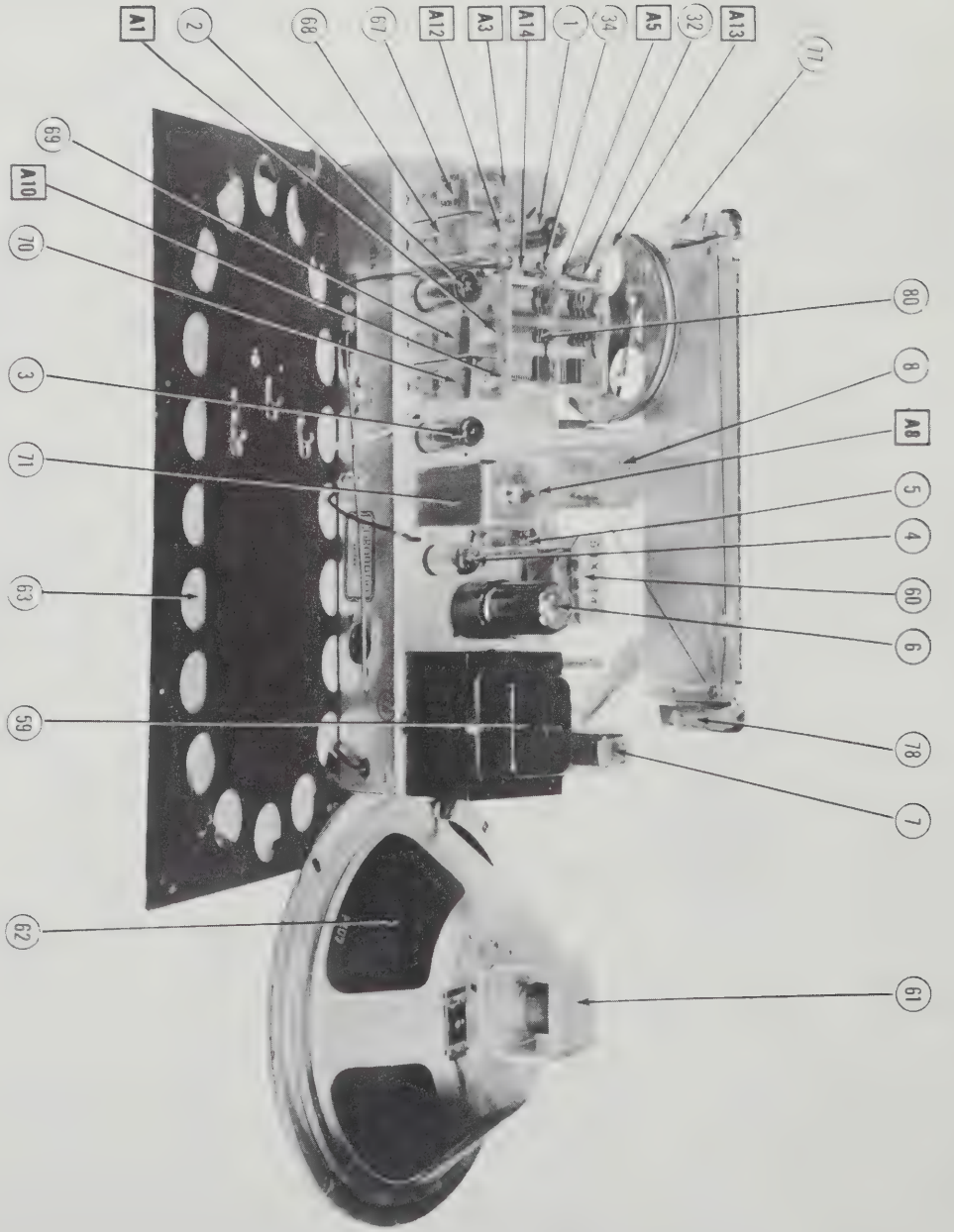
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
36A	500KΩ	½	36X372	D13-133X	AT-78	Volume Control tapped @ 100KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 36A per instructions
C	Switch		" "	41	SW-A	" " " " "
37A	3 Mer.	½	40X285	D13-140	AM-67-Z	Tone Control
B	Shaft		Not Req.	E	KSS-3	Attach to 37A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CORONADO PART No.	IRC PART No.	IDENTIFICATION CODES
38	33KΩ	½	B84233	BTS-33K	Red-Red-Or. Osc. Grid
39	5600Ω	½	B83392	BTS-5600	Gr.-White-Red Conv. Screen Decoup.
40	1200Ω	½	B84122	BTS-1200	Br.-Red-Red Conv. Plate Decoup.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA CORONADO PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
41	8200Ω	2	B84822	BT-2-8200	Gray-Red-Red Bleeder
42	68Ω	½	B83680		Blue-Gray-Blk. 1st IF Cathode
43	1200Ω	½	B84122	BTS-1200	Br.-Red-Red 1st IF Decoup.
44	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
45	47KΩ	*		BTS-47K	Yl.-Vi.-Or. Diode Filter
46	68Ω	½	B83680		Blue-Gray-Blk. 2nd IF Cathode
47	1000Ω	½	B84102	BTS-1000	Br.-Blk.-Red 2nd IF Decoupling
48	27KΩ	½	B84273	BTS-27K	Red-Vi.-Or. De-emphasis
49	6800Ω	½	B84682	BTS-6800	Blue-Gray-Red Ratio Det. Diode Load
50	6800Ω	½	B84682	BTS-6800	Blue-Gray-Red " " "
51	1 Meg.	½	B85105	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
52	470K	½	B85474	BTS-470K	Yl.-Vi.-Yl. Series Phono
53	15KΩ	½	B84153	BTS-15K	Br.-Grn.-Or. Tone Comp.
54	10 Meg.	½	B85106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
55	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
56	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Output Grid
57	270Ω	2	B84271	BW-½-270	Red-Vi.-Br. Output Cathode
58A	1400Ω	6	43X224	AB-1450	Filter
B	1000	4		AB-1000	"

*Items 45 and 23A & B are combined in one unit obtainable under Part #76X1.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA CORONADO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
59	117V AC @ .5A	520V CT .075A DC	5.2V AC @ 2.0A	6.7V AC @ 2.2A	53X290	P-6011‡	T22R02	

‡Drill new mtg. holes and add series res. to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	IMPEDANCE SEC.	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CORONADO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
60	6300Ω	3.4Ω	475Ω	1.1Ω	51X134	A-3849	T22S87	A-2902	

SPEAKER

ITEM No.	RATINGS FIELD	RATINGS VC IMP.	REPLACEMENT DATA CORONADO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	PM	3.2Ω		ST-119†		†Replace output transformer to match 6-8Ω voice coil.
61	CONE DIA.	VC DIA.	12A460	Mod. P10-T	10A31	
62	8"	9/16"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CORONADO PART No.	MEISSNER PART No.	
63	Loop Ant.	0Ω	.9Ω	26A478		
64	FM Ant.Coil		0Ω	9A1956		
65	BC Osc.Coil	.5Ω	5.1Ω	9A1929	14-1060	
66	FM " "		0Ω	9A1938		
67	AM 1st IF	15.5Ω	15.1Ω	9A1934	16-6678	
68	FM " "	.6Ω	.1Ω	9A1932		
69	AM 2nd IF	14.8Ω	14.8Ω	9A1935	16-6678	
70	FM 2nd IF	.6Ω	.1Ω	9A1933		
71	FM Disc. Trans.	.9Ω	.1Ω	9A1936		
72	Choke		0Ω	9A1940		Item 72 is wound on a 10Ω 1/4 W. resistor
73	"		0Ω	9A1967		Item 73 is wound on a 10Ω 1/4 W. resistor
74	Plate Choke		.3Ω	9A1882		
75	Filament Ch.		.3Ω	9A1882		
76A	Line Choke		0Ω	9A1930		Items 76A & B are wound on same form.
B	" "		0Ω			

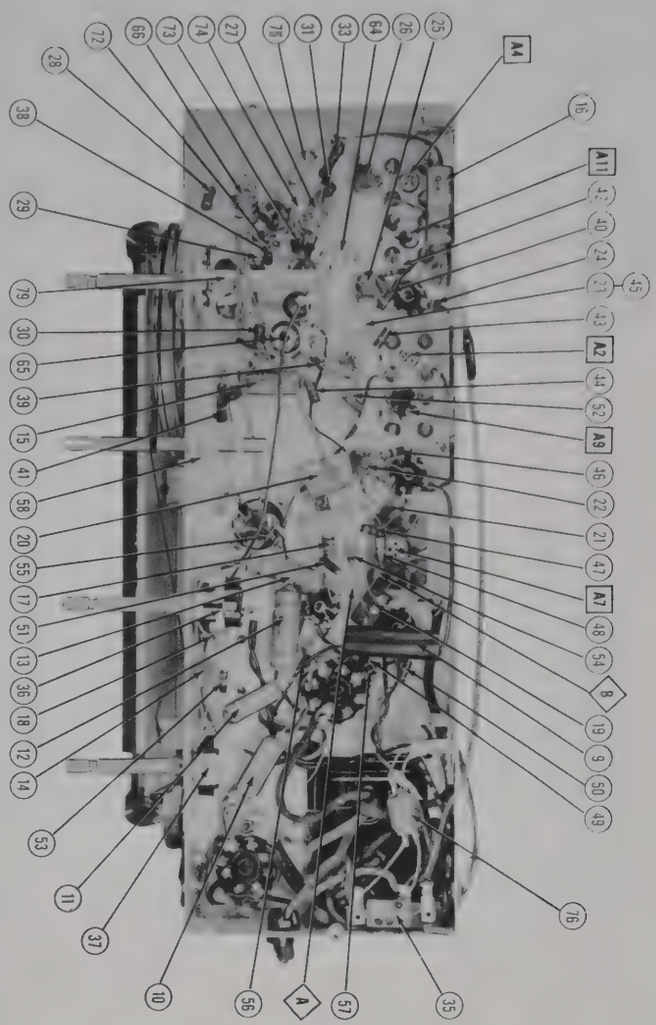
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA CORONADO PART No.		INSTALLATION NOTES
77	Bayonet	6-8	0.15	Brown	7A103		Type #47
78	"	6-8	0.15	"	7A103		" "

MISCELLANEOUS

ITEM No.	PART NAME	CORONADO PART No.	NOTES
79	Switch	2A375	
80	Tuning Gang	14A204	Band-Phono (40-540MMF, 45-225MMF)
A6	Trimmer	17A235	BC Ant. Adj.
A13	"	26A489	FM Osc. Adj.
	Dial Glass	58X709	
	Dial Pointer	15X241	

CHASSIS—BOTTOM VIEW



FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01 MFD	High side to Pin 1 (grid) of 6BA6 2nd IF Tube (3). Low side to chassis.	10.7MC (Unmodulated)	FM (fully clockwise)	Tuning cap. fully open.	DC probe to Point ◇. Common to chassis	A7	Adjust for maximum deflection.
6	"	"	"	"	"	"	A8	Use a zero center scale VTVM if available. Adjust for zero deflection. Repeat Steps 5 and 6 until no further improvement can be made.
7	"	High side to Pin 1 (grid) of 6BA6 1st IF Tube (2). Low side to chassis.	"	"	"	DC probe to Point ◇. Common to chassis	A6,A10	Adjust for maximum deflection. Attenuate Output of Sig. Gen. to give same maximum resulting as obtained in Step 5.
8	"	High side to Pin 7 (grid) of 6BE6 Low side to chassis.	"	"	"	"	A11,A12	" " "
9	300Ω carbon res.	Disconnect line FM ant. High side of sig. gen. to ungrounded FM ant. terminal Low side to chassis.	108.5MC (Unmodulated)	"	"	"	A13	Adjust for maximum deflection.
10	"	"	104.5MC (Unmodulated)	"	Tune for maximum deflection.	"	A14	Rock tuning cap. and adjust for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made.

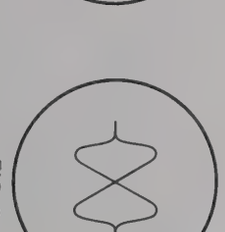
FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

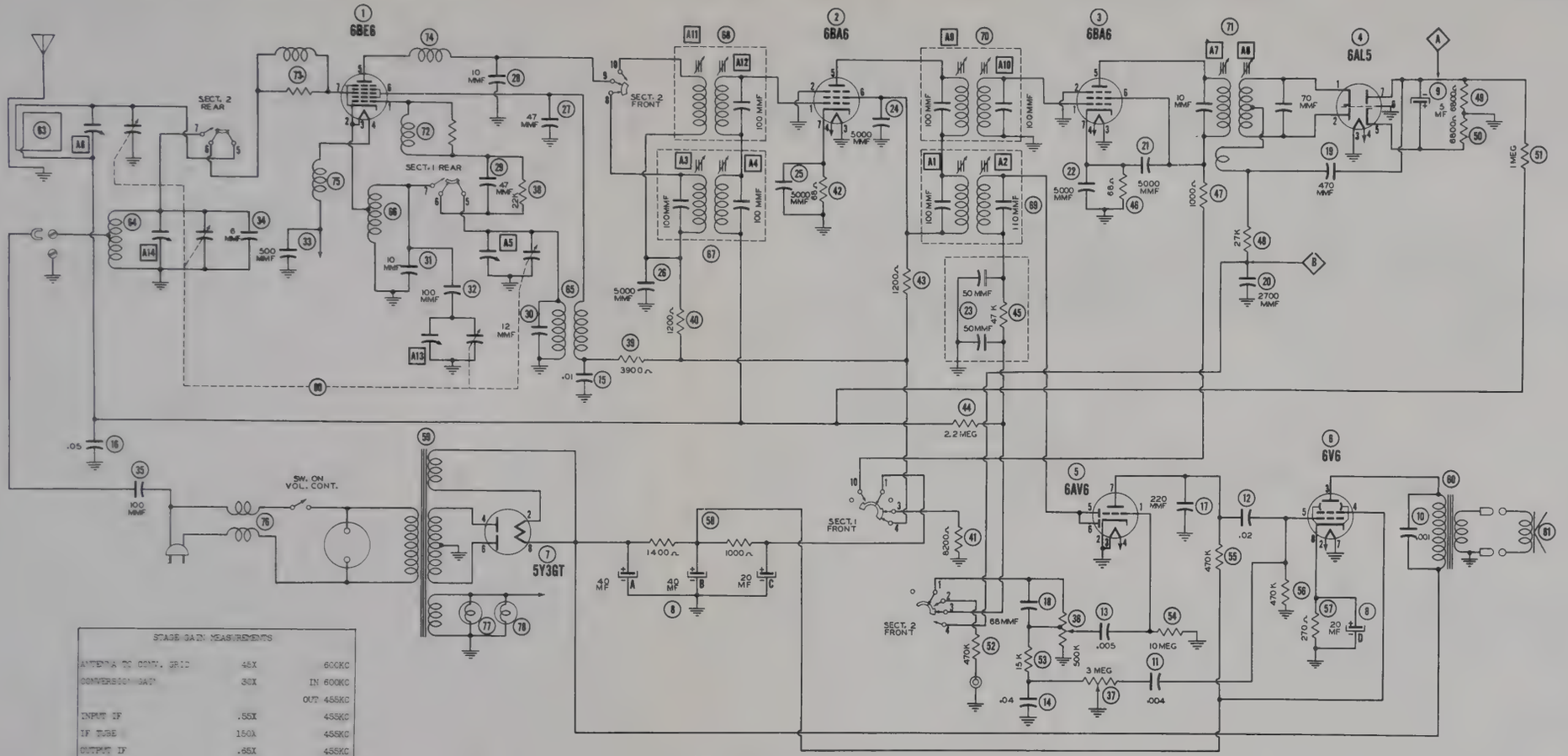
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
5	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Mod.)	FM	Tuning cap. fully open.	Vertical input to Point ◇. Ground to chassis.	A7,A10 A9	Disconnect 5 MFD cap. from Point ◇. Adjust A7, A10 and A9 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD	Disconnect lead from Pin 7 (grid) of 6BE6 to switch. Connect 100KΩ resistor from Pin 7 to chassis	"	"	"	"	A12,A11	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
7	.01 MFD	Remove 100KΩ resistor from Step 6. Reconnect Pin 7 of 6BE6 to switch. High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A8	Reconnect 5 MFD cap. to Point ◇. Adjust A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2.
8	300Ω carbon res.	Disconnect line FM ant. High side of sig. gen. to ungrounded FM Ant. terminal Low side to chassis.	108.5MC (Freq. Mod.)	"	Tune for coincidence.	Vertical input to Point ◇. Ground to chassis.	A13	Disconnect 5 MFD cap. from Point ◇. Adjust A13 for coincidence of pattern per Fig. 1.
9	"	"	104.5MC (Freq. Mod.)	"	"	"	A14	Adjust for maximum amplitude of pattern per Fig. 1. Repeat Steps 8 & 9 until no further improvement can be made. Reconnect 5 MFD cap. to Point ◇.

FIG. 1

FIG. 2



FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.



STAGE GAIN MEASUREMENTS		
ANTENNA TO CONV. GRID	45X	600KC
CONVERSION GAIN	30X	IN 600KC
		OUT 455KC
INPUT IF	.55X	455KC
IF TUBE	150X	455KC
OUTPUT IF	.65X	455KC
AUDIO	50X	400 ∿
OUTPUT	25X	400 ∿

IF = 455 KC AM

IF = 10.7 MC FM

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	-7VDC§	0V.	0V.	6.7VAC	140VDC	115VDC	0V.	-
* 2	6BA6	-.2VDC	0V.	0V.	6.7VAC	125VDC	125VDC	1.2VDC	-
* 3	6BA6	0V.	0V.	0V.	6.7VAC	120VDC	120VDC	1.2VDC	-
4	6AL5	-2VDC	.2VDC	0V.	6.7VAC	.8VDC	0V.	-.6VDC	-
5	6AV6	-.7VDC	0V.	0V.	6.7VAC	-.5VDC	-.5VDC	75VDC	-
6	6V6GT	0V.	6.7VAC	240VDC	200VDC	0V.	0V.	0V.	8.5VDC
7	5Y3GT	0V.	280VDC	0V.	280VAC	0V.	280VAC	0V.	200VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BE6	22KΩ	0Ω	0Ω	.1Ω	10KΩ	12KΩ	700KΩ	-
* 2	6BA6	1 Meg.	0Ω	0Ω	.1Ω	10KΩ	10KΩ	68Ω	-
* 3	6BA6	.1Ω	0Ω	0Ω	.1Ω	70KΩ	70KΩ	68Ω	-
4	6AL5	520KΩ	520KΩ	0Ω	.1Ω	6.8KΩ	INF.	6.8KΩ	-
5	6AV6	10 Meg.	0Ω	0Ω	.1Ω	550KΩ	550KΩ	480KΩ	-
6	6V6GT	INF.	.1Ω	10KΩ	10KΩ	470KΩ	.5Ω	0Ω	270Ω
7	5Y3GT	INF.	10KΩ	INF.	100Ω	INF.	110Ω	INF.	10KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

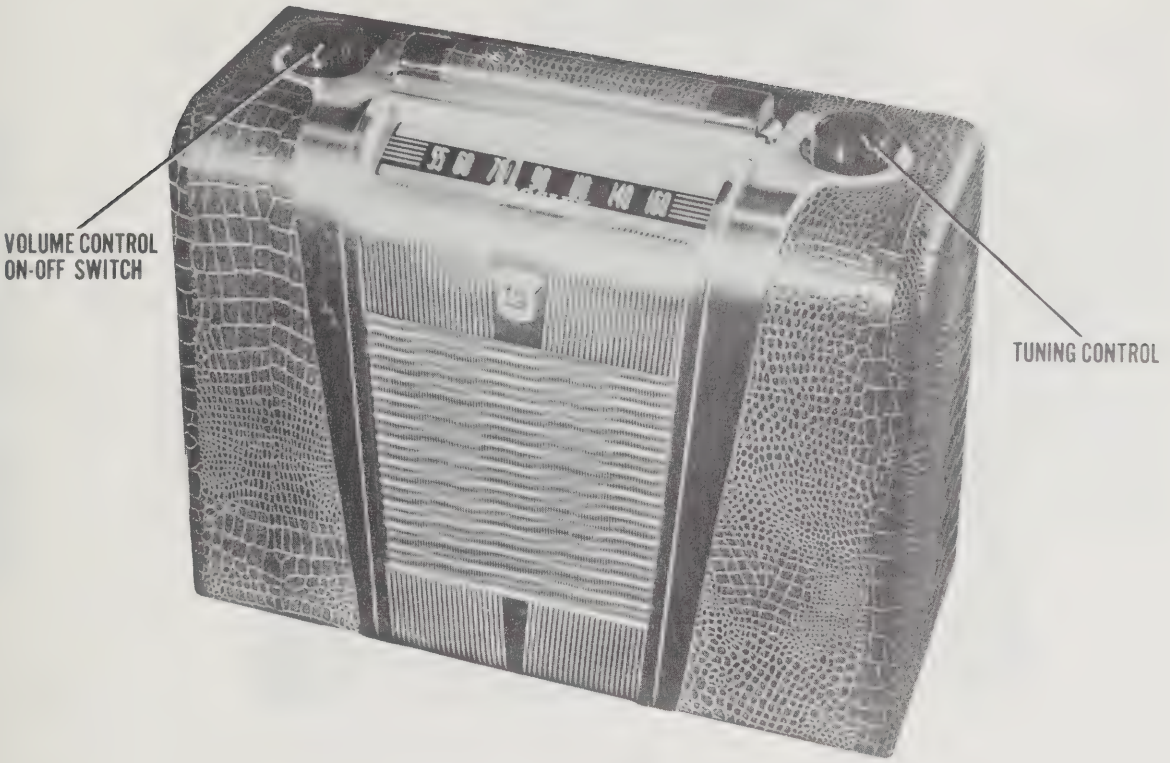
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948



CROSLEY MODEL 9-302
BATTERY-LINE OPERATED

CROSLEY MODEL 9-302
BATTERY-LINE OPERATED

CROSLEY MODEL 9-302

TRADE NAME	Crosley, Model 9-302
MANUFACTURER	Crosley Corp., 1329 Arlington St., Cincinnati, Ohio
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 1L4 RF Amp., 1R5 Converter, 1L4 IF Amp., 1U5 Det.-AVC-AF, 3V4 Power Output.
POWER SUPPLY RATING	110-120 Volts AC-DC or 9 Volts "A" Supply and 90 Volts "B" Supply in Pack Form .13 Amp. @ 117 Volts AC or 56MA @ 9 Volts DC and 13.5MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	(Shunt 47KΩ carbon resistor from front stator of tuning cap. to low side of loop secondary.) High side to front stator of tuning cap. Low side to B-.	455KC	Tuning cap. fully closed.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF to reduce hum modulation.
2	200MMFD	"	1620KC	Tuning cap. fully open.	"	A5	Preset trimmer opposite A5 to 1/8 turn from closed position. Adjust A5 for maximum output.
3	200MMFD	"	1400KC	Tune for maximum output.	"	A6	Preset trimmer opposite A6 to 1/4 turn from closed position. Adjust A6 for maximum output. Remove 47KΩ resistor from tuning cap. Install receiver and battery pack in cabinet.
4	200MMFD	High side to ext. ant. clip. Low side to B-.	"	"	"	A7	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

CROSLEY
MODEL 9-30[illegible]

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: CROSLEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	1L4	1L4	6AR	
2	Converter	1R5	1R5	7AT	
3	IF Amp.	1L4	1L4	6AR	
4	Det.-AVC-AF	1U5	1U5	6BW	
5	Power Output	3V4	3V4	6PX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: CROSLEY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	B136294	PRSA/50502	EDL4215C	DSB-305	TA440	Filter-Red
B	40	100					TA25	" -Blue
C	20	10						Fil. Bypass-Green
7	1000	10	B136456		(2)BRH125#	DZTP-1000-12	HLV1012	" "
8	.05	200		484-05	DT2S5	ST-4-05	TC-15	Line Filter
9	.15	200		484-.15	DT4P2	ST-4-2	72P5	Line Isolation
10	.003	600		634-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
11	.001	600	39001-7	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
12	.05	200		484-05	DT2S5	ST-4-05	TC-15	AF Screen Bypass
13	.001	600	39001-7	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
14	.1	200		484-.1	DT2P1	ST-2-1	TC-1	Fil. Bypass
15	.25	200		484-.25	DT2P25	ST-2-25	TC-2	" "
16	.1	200		484-.1	DT2P1	ST-2-1	TC-1	Screen Bypass
17	.1	200		484-.1	DT2P1	ST-2-1	TC-1	Fil. Bypass
18	.01	200		484-01	DT2S1	ST-4-01	TC-11	AVC Filter
19	.1	200		484-.1	DT2P1	ST-2-1	TC-1	RF Grid Filter
20	.003	600	39001-76	684-003	DT6D3	ST-6-003	TC-23	Ext. Ant. Isolation
21	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Output Grid Byp.-See Note
22	75	500	C137727-22	1468-00075	5W5Q7	MOS.5-47	1FM-475	AF Plate Bypass-Cer.
23	75	500	C137727-22	1468-00075	5W5Q7	MOS.5-47	1FM-475	Osc. Grid Cap.-Cer.
24	10	500						Fixed Trimmer-Cer.

Note-Not used in all models.
#Parallel sections to obtain desired capacity.

CONTROLS

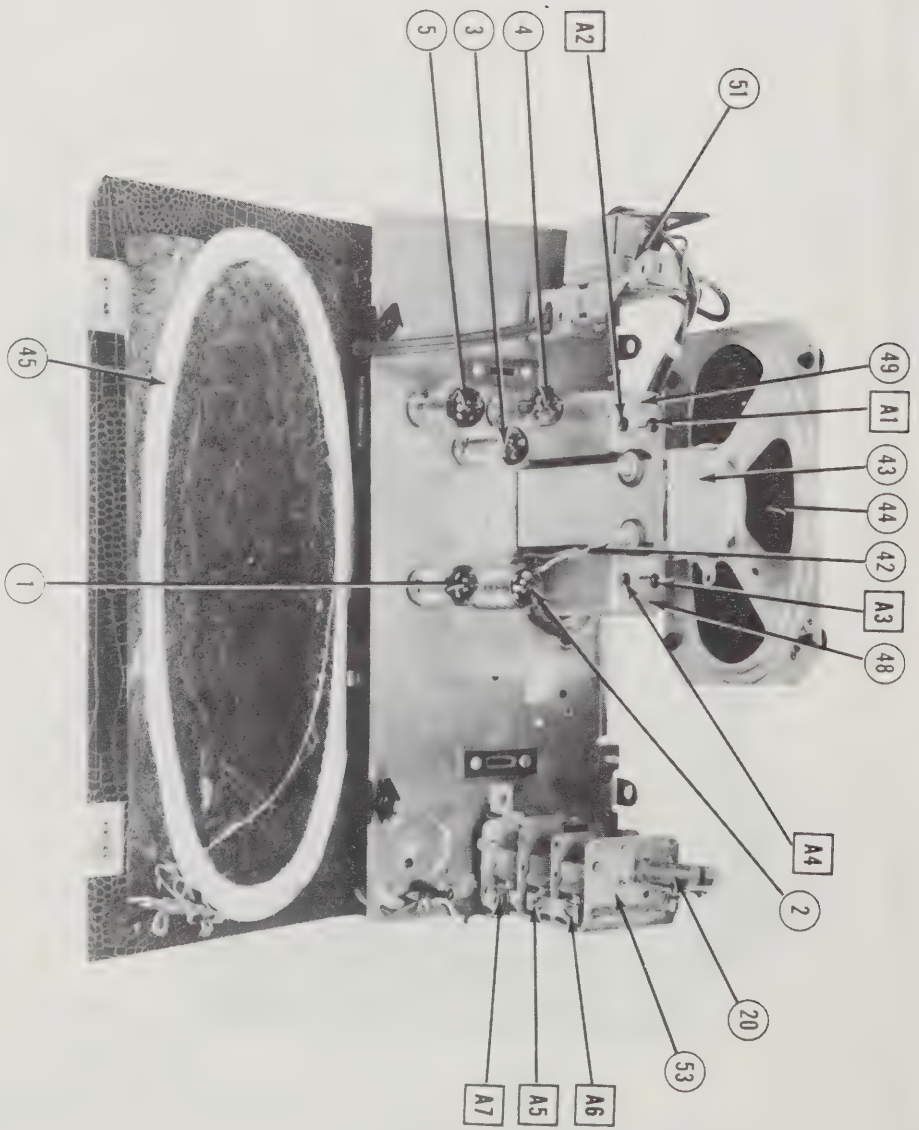
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
25A	1 Meg.	½	33368-14	D1?-137	AM-63-2	Volume Control B136751*
B	Shaft		Not Req.	5	KSS-3	Attach to 25A per instructions
C	Switch		3.300-2	42	SW-A2	" " " " "

*This part number replaces complete unit.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: CROSLEY PART No.	IRC PART No.	IDENTIFICATION CODES
26	2.2 Meg.	½	39373-97	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
27	3.3 Meg.	½	39373-100	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
28	3.3 Meg.	½	39373-100	BTS-3.3 Meg.	Or.-Or.-Grn. " "
29	100KΩ	½	39373-74	BTS-100K	Br.-Blk.-Yl. Osc. Grid
30	1000Ω	½	39373-33	BTS-1000	Br.-Blk.-Red Fil. String
31	15KΩ	½	39373-57	BTS-15K	Br.-Grn.-Or. Screen Dropping
32	10 Meg.	½	39373-107	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
33	3.3 Meg.	½	39373-100	BTS-3.3 Meg.	Or.-Or.-Grn. AF Screen
34	680KΩ	½	39373-90	BTS-680K	Blue-Gray-Yl. AF Plate Load
35	1 Meg.	½	39373-82	BTS-1 Meg.	Br.-Blk.-Grn. Output Grid
36	1200Ω	½	39373-34	BTS-1200	Br.-Red-Red Fil. String
37	2200Ω	½	39373-40	BTS-2200	Red-Red-Red " "
38	2000Ω	6	W-143123	AB-2000	Fil. Dropping
39	220Ω	1	39373-129	BW-1-220	Red-Red-Br. " "
40	1500Ω	½	39373-36	BTS-1500	Br.-Grn.-Red Filter
41	[illegible]	[illegible]	[illegible]	[illegible]	Gray-Red-Blk. Surge Limiter

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
42	10KΩ	4.4Ω	700Ω	.5Ω	B-135670	A-3279†	T22S47†	A-2827	†Drill new mounting holes and mount on chassis.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA CROSLEY PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	C IMP.				
43	PM	4.4Ω	13-2460		4CA1	
	CONE DIA.	VC DIA.				
44	4"x6"	9/16"				

R F COILS

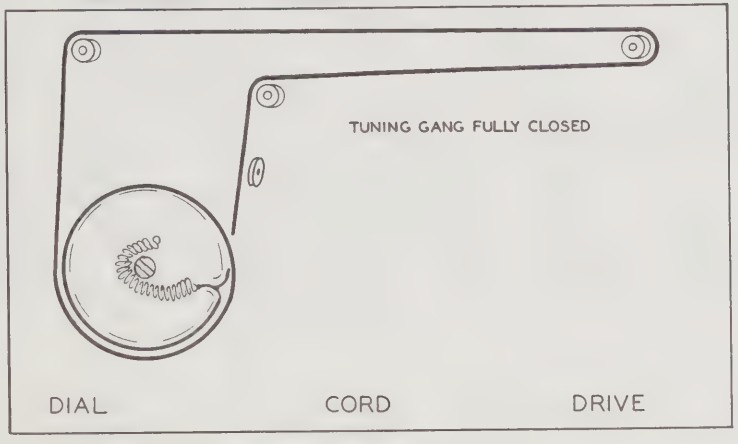
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA CROSLEY PART No.	MEISSNER PART No.
45	Loop Ant.	0Ω	2Ω	AC-143060	
46	RF Trans.	95Ω	4.8Ω	AW-136966	
47	Osc. Coil	2.3Ω	6Ω	AW-144209	14-1060
48	Input IF	22.5Ω	22Ω	AW-136288	16-5740
49	Output IF	18Ω		AW-136289	16-6670

BATTERIES

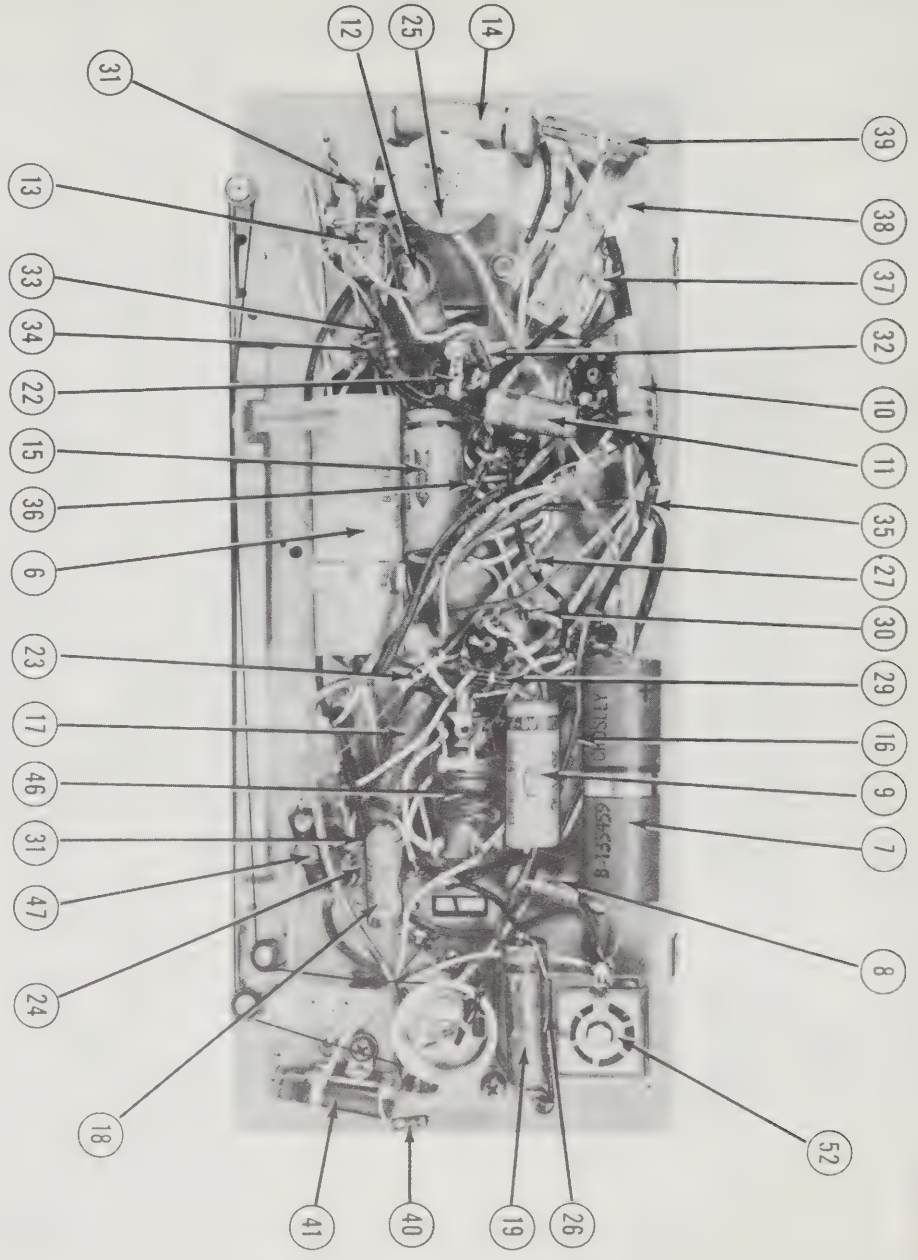
ITEM No.	VOLTAGE	CROSLEY PART No.	REPLACEMENT DATA EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
50	9V "A" 90V "B"	CR65			753			F6A60	

MISCELLANEOUS

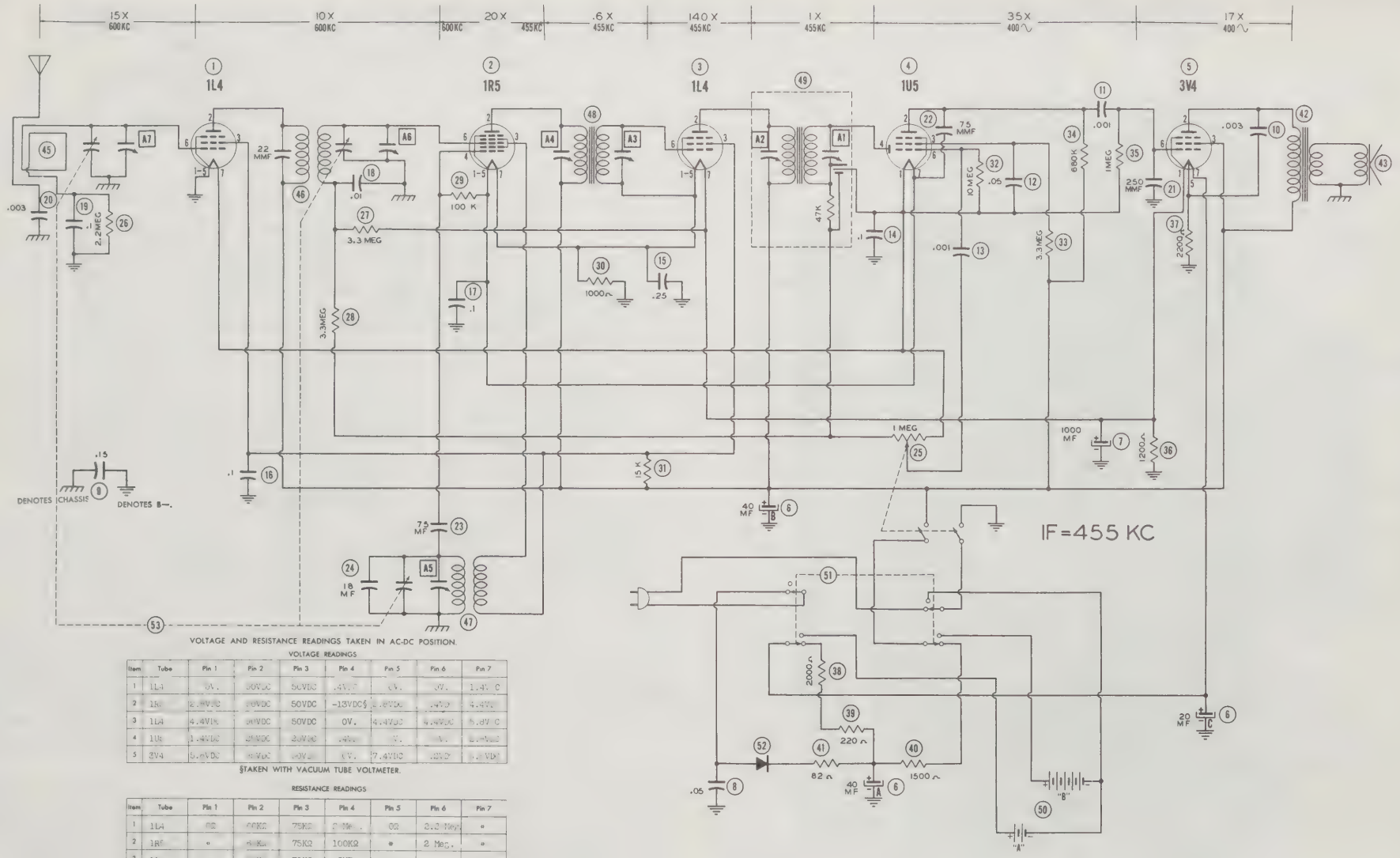
ITEM No.	PART NAME	CROSLEY PART No.	NOTES
51	Switch	AB-143068	AC/DC-Batt.
52	Rectifier	B-143883-2	Selenium
53	3 Gang Var. Cap.	AB-143151	(30-464MMF, 31-470MMF, 32-280MMF)
	Cabinet	R-143031	
	Dial Glass	C-143121	
	Knob	W-135590-3	
	Dial Pointer	B-13.482	



CHASSIS—BOTTOM VIEW



CROSLEY MODEL 9-202



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1L4	0V.	90VDC	50VDC	.4V.	0V.	0V.	1.4V.
2	1R5	2.8VDC	90VDC	50VDC	-13VDC§	2.8VDC	.4VDC	4.4V.
3	1L4	4.4VDC	90VDC	50VDC	0V.	4.4VDC	4.4VDC	5.8V.
4	1U5	1.4VDC	2VDC	2.0VDC	.4V.	0V.	0V.	2.4VDC
5	3V4	5.8VDC	90VDC	90VDC	0V.	7.4VDC	.2VDC	5.8VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1L4	0Ω	60KΩ	75KΩ	0 Meg.	0Ω	2.2 Meg.	*
2	1R5	*	60KΩ	75KΩ	100KΩ	*	2 Meg.	*
3	1L4	*	60K	75KΩ	INF.	*	*	*
4	1U5	*	60K	3.3 Meg.	1 Meg.	INF.	10 Meg.	*
5	3V4	*	60K	60K	INF.	*	1 Meg.	*

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B- CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

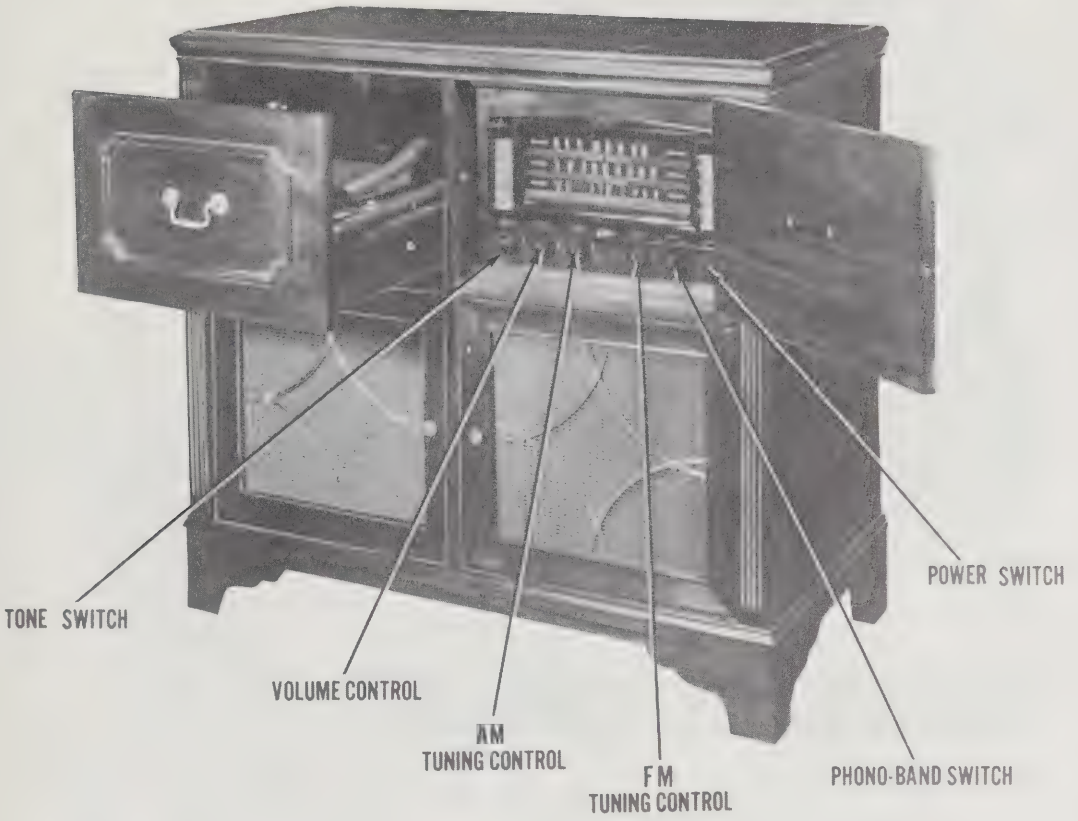
©Howard W. Sams & Co., Inc. 1948

4817-6

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurment operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting volume control to Pin 1 of 1U5.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

DELCO MODEL R-1253,
R-1254, R-1255



DELCO MODEL R-1253,
R-1254, R-1255

DELCO MODEL R-1254

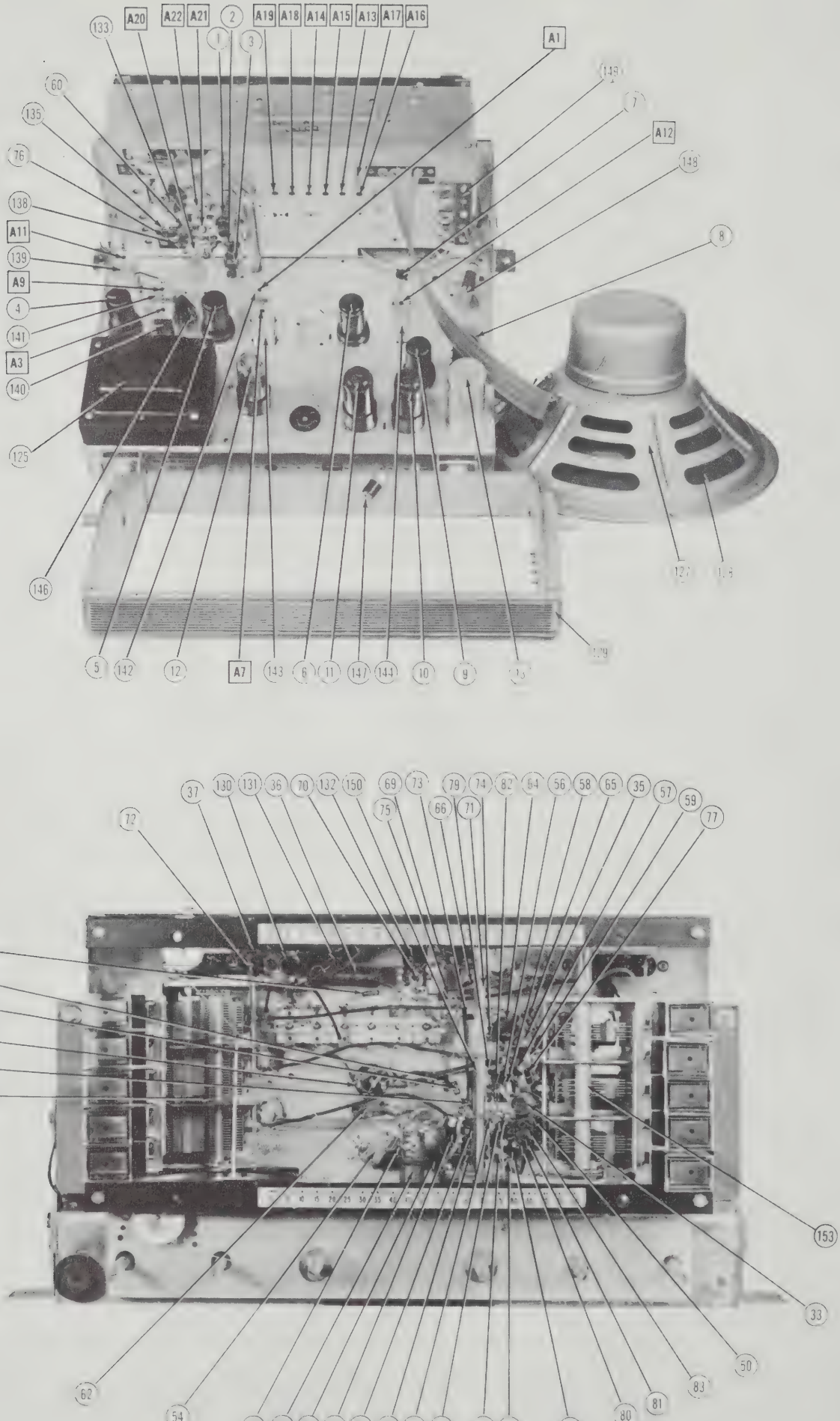
TRADE NAME	Delco, Models R-1253, R-1254, R-1255
SUPPLIER	United Motors Service, Div. of GMC, General Motors Bldg., Detroit 2, Mich.
TYPE SET	AC Operated Combination Phono-Radio, 2 Band AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (TWELVE)	Types, 6BA6 RF Amp., 6AU6 Mixer, 6J6 Osc.-AFC, 6SG7 1st IF Amp., 6SG7 2nd IF Amp., 6SH7 FM Limiter-AM Det., 6AL5 FM Ratio Det., 6SQ7 AF Amp., 6SQ7 Phase Inv., (2) 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.96 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	550-1700KC SHORT WAVE 5.8-18MC FREQ. MOD. 88-108MC

PUSHBUTTON ADJUSTMENTS

1. Make up list of stations desired to be set up.
2. Turn receiver on and allow to warm up for at least fifteen minutes.
3. Insulate muting switches by inserting paper strip between contacts.
4. Remove transparent section of button and insert screwdriver thru large hole of button.
5. Loosen locking screw not more than one turn.
6. Depress pushbutton and manually tune in station desired to be set up, then tighten locking screw.
7. Insert call letter tab of station between transparent section of button and metal insert and replace insert in button. This station is now set up.
8. Repeat the above procedure for the remaining buttons to be set up.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


A20
A22
A21
2
A19
A18
A14
A15
A13
A17
A16
133
1
3
A1
60
135
76
138
A11
139
A9
4
141
A3
140
125
146
148
7
A12
148
8
5
142
12
A7
143
6
11
147
144
10
9
15
129
37
130
131
36
70
132
150
69
73
79
74
82
64
56
58
65
35
57
59
77
72
75
66
71
78
63
61
134
67
154
153
33
50
83
62
54
137
136
34
51
86
87
55
84
53
52
85
80
81

A8
A4
A10
A5
A2
A6
A
B
C
D
17
14
117
114
40
118
111
16
145
119
15
38
39
23
126
47
100
48
30
123
122
121
120
98
97
25
95
28
94
29
26
49
91
92
31
151
27
96
155
93
32
102
46
101
88
90
89
44
104
45
22
21
10
19
108
42
43
20
152
105
106
124
24
99
103
110
18
112
109
116
113
115

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Mixer	6AU6	6AU6	7BK	
3	Osc.-AFC	6J6	6J6	7BF	
4	1st IF Amp.	6SG7	6SG7	7BK	
5	2nd IF Amp.	6SG7	6SG7	7BK	
6	FM Limiter-AM-Det.	6SH7	6SH7	7BK	
7	FM Ratio Det.	6AL5	6AL5	6BT	
8	AF Amp.	6SN7	6SN7	8Q	
9	Phase Inv.	6SN7	6SN7	8Q	
10	Power Output	6V6GT	6V6GT	7AC	
11	" "	6V6GT	6V6GT	7AC	
12	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
13A	60	450	1217487	AF4444J*	UP22224S*	DY-4x20-450*	EL-420*	● Filter
B	20	450						■ "
C	20	400		PRS450/20	BR2045	M-20-450	UT-20	▲ "
14	10	25	J100	PRS25/10	BR102A	M-10-25	TA-10	Cathode Bypass
15	.01	600	1217227	684-01	DT6S1	MPH-6-01	TC-11	Line Filter
16	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
17	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	" "
18	.05	600	E503	684-05	DT6S5	ST-6-05	TC-15	Feedback
19	.003	600	E302	684-003	DT6D3	ST-6-003	TC-23	Audio Coupling
20	.003	600	E302	684-003	DT6D3	ST-6-003	TC-23	Tone Comp.
21	.05	600	E503	684-05	DT6S5	ST-6-05	TC-15	FM Diode Load Cap.
22	.05	600	E503	684-05	DT6S5	ST-6-05	TC-15	" " " "
23	.05	600	E503	684-05	DT6S5	ST-6-05	TC-15	Limiter Decoupling
24	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	" "
25	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Decoup.
26	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	2nd IF Screen Bypass
27	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	2nd IF Cathode Bypass
28	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoupling
29	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	1st IF Screen Bypass
30	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	RF Bypass Power Supply
31	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	AVC Filter
32	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	" "
33	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	Mixer Plate Decoupling
34	.02	600	E203	684-02	DT6S2	ST-6-02	TC-12	AVC Filter
35	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	Decoupling
36	.05	600	E503	684-05	DT6S5	ST-6-05	TC-15	Mixer Grid Filter
37	.02	600	E203	684-02	DT6S2	ST-6-02	TC-12	AVC Filter
38	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	Fil. Bypass
39	.01	600	E103	684-01	DT6S1	ST-6-01	TC-11	" "
40	150	500	G151	1468-00015	5W5T15	MO.5-315	1FM-315	Output Grid Bypass
41	150	500	G151	1468-00015	5W5T15	MO.5-315	1FM-315	Tone Comp.-See Note 1
42	47	500	G470	1468-00005	5W5Q5	MO.5-45	1FM-45	" "
43	470	300	1217712	1468-0005	5W5T5	MO.5-35	1FM-35	" " -Cer.
44	470	300	G471	1468-0005	5W5T5	MO.5-35	1FM-35	Phono Coupling
45	1000	300	1217713	1468-001	1W5D1	MW.5-21	1FM-21	De-emphasis-Cer.
46	150	500	G151	1468-00015	5W5T15	MO.5-315	1FM-315	RF Bypass
47	1000	300	1217713	1468-001	1W5D1	MW.5-21	1FM-21	" " -Cer.
48	47	500	G470	1468-00005	5W5Q5	MO.5-45	1FM-45	IF Coupling
49	150	500	G151	1468-00015	5W5T15	MO.5-315	1FM-315	" "
50	8000	300	1218329					Osc. Cathode Byp.-Cer.
51	100	500	G101	1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
52	100	300	1218411	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Feedback-Cer.
53	1000	300	1217713	1468-001	1W5D1	MW.5-21	1FM-21	" " "
54	3600	300	G362					Fixed Padder
55	47	300	1217715	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
56	10	300	1217714	1468-00001	5W5Q1	MO.5-41	MS-41	Mixer Plate Byp.-Cer.
57	5000	300	1218298	1467-000	1D5D5	MW.5-25	1FM-25	Mixer Screen Bypass-Cer.
58	3.3	300	1218409					Osc. Feedback-Cer.
59	100	300	1218411	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
60	47	500	G470	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Bypass
61	4.7	300	1218408					Osc. Feedback-Cer.

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
112	470Ω	½	A471	BTS-4700	Yl.-Vi.-Red Feedback
113	47KΩ	½	A474	BTS-470K	Yl.-Vi.-Yl.-1st AF Plate Load
114	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. Phase Inv. Grid
115	3900Ω	½	A392	BTS-3900	Or.-White-Red Phase Inv. Cathode
116	220KΩ	½	A224	BTS-220K	Red-Red-Yl. Phase Inv. Plate Load
117	330KΩ	½	A334	BTS-330K	Or.-Or.-Yl. Output Grid
118	470KΩ	½	A474	BTS-470K	Yl.-Vi.-Yl. " "
119	330Ω	2	C331	BW-2-330	Or.-Or.-Br. Output Cathode
120	1200Ω	2	C122	BT-2-1200	Br.-Red-Red Filter
121	1200Ω	2	C122	BT-2-1200	Br.-Red-Red "
122	1000Ω	2	C102	BT-2-1000	Br.-Blk.-Red "
123	1000Ω	2	C102	BT-2-1000	Br.-Blk.-Red "
124	6.8Ω	1		BW-1-6.8	Blue-Gray-Blk. Filament Dropping-See Note

Note-Some models use two 12Ω resistors in parallel in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDARSON PART No.	REPLACEMENT DATA: MERIT PART No.
125	117V AC @ .96A	680V CT .138A DC	5.2V AC @ 2.0A	6.6V AC @ 4.15A	1218417	P-6314#	T-22R07#	P-2855#

#Add series resistor to reduce plate voltage.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
126	10KΩ CT	3.5Ω	560Ω CT	.3Ω	1218418	A-3870	T22S56‡	A-2936‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: FIELD	RATINGS: VC IMP.	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
127	PM	3.5Ω	1218367	ST-102† Mod. P12-S	12AG†	†Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
128	11-3/8"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: DELCO PART No.	REPLACEMENT DATA: MEISSNER PART No.
129	Loop Ant.	.1Ω	.3Ω	1217986	
130	Loop Load. Coil		5Ω	1217643	
131	Ant. Load. Coil		6.7Ω	1218351	
132	Ant. Coil SW	.1Ω	.3Ω	1218355	
133	Ant. Coil FM		0Ω	1217649	
134	BC RF Coil	6.7Ω	20.7Ω	1217646	
135	FM " "		0Ω	1217718	
136	BC Osc.Coil		4.8Ω	1217647	
137	SW " "		.3Ω	1217644	
138	FM " "		0Ω	1217648	
139A	AM 1st IF		7Ω	1218413	
B	FM " "		.7Ω		
140	AM 2nd IF	8.8Ω	8.8Ω	1218416	
141	FM " "	.7Ω	.7Ω	1218414	
142	AM 3rd IF	8.8Ω	8.8Ω	1218415	
143	FM " "	.7Ω	.7Ω	1218414	
144	FM Det.Trans	.7Ω	.7Ω	1218265	
145	RF Choke		.2Ω	1218362	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
62	470	300	G471	1468-0003	5W5T5	MO.5-35	1FM-35	Fixed Trimmer
63	2.2	300	1219407					Osc. Feedback-Cer.
64	5000	300	1218298	1467-005	1D5D5	MW.5-25	1FM-25	RF Screen Bypass-Cer.
65	47	300	1217715	1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling-Cer.
66	100	500	G101	1468-0001	5W5T1	MO.5-31	1FM-31	" "
67	1000	300	1217713	1468-001	1W5D1	MW.5-21	1FM-21	Filament Bypass-Cer.
156	3.3	300	1218406					IF Coupling-See Note 2

*Parallel sections to obtain desired capacity.
Note 1-Not used in all models.
Note 2-This item may be inside IF transformer on some models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	DELCO PART No.	IRC PART No.	CLAROSTAT PART No.	
68A	2 Meg.	½	1218361	D17-130X	AT-119	Volume Control tapped @ 200KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 68A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	DELCO PART No.	IRC PART No.	
69	1 Meg.	½	A105	BTS-1 Meg.	Br.-Blk.-Grn. AFC Networ
70	330KΩ	½	A234	BTS-330K	Or.-Or.-Yl. AFC Network
71	2200Ω	½	A222	BTS-2200	Red-Red-Red Ant. Loadin
72	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. AVC Network
73	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. RF Grid
74	33KΩ	1	B333	BTA-33K	Or.-Or.-Or. RF Screen
75	47Ω	½	A470		Yl.-Vi.-Blk. Parasitic Supp.
76	10Ω	½	A100		Br.-Blk.-Blk. " "
77	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. Equalization
78	2.2 Meg.	½	A225	BTS-2.2 Meg.	Red-Red-Grn. Mixer Grid
79	220KΩ	½	A224	BTS-220K	Red-Red-Yl. Mixer Screen
80	10Ω	½	A100		Br.-Blk.-Blk. Parasitic Supp.
81	10Ω	½	A100		Br.-Blk.-Blk. " "
82	1000Ω	½	A102	BTS-1000	Br.-Blk.-Red Decoupling
83	220Ω	½	A221		Red-Red-Br. Osc. Cathode
84	22KΩ	½	A223	BTS-22K	Red-Red-Or. Osc. Grid
85	10Ω	½	A100		Br.-Blk.-Blk. Osc. Couplin
86	220Ω	½	A221		Red-Red-Br. AFC Network
87	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. " "
88	10KΩ	2	C103	BT-2-10K	Br.-Blk.-Or. Voltage Dropping
89	10KΩ	2	C103	BT-2-10K	Br.-Blk.-Or. " "
90	470Ω	1	B471	BTA-470	Yl.-Vi.-Br. Decoupling
91	220KΩ	½	A224	BTS-220K	Red-Red-Yl. 1st IF Grid
92	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. AVC Network
93	1 Meg.	½	A105	BTS-1 Meg.	Br.-Blk.-Grn. " "
94	47KΩ	1	R473	BTA-47K	Yl.-Vi.-Or. 1st IF Screen
95	1000Ω	½	A102	BTS-1000	Br.-Blk.-Red 1st IF Plate Decoup.
96	220Ω	½	A221		Red-Red-Br. 2nd IF Cathode
97	47KΩ	1	R473	BTA-47K	Yl.-Vi.-Or. 2nd IF Screen
98	1000Ω	½	A102	BTS-1000	Br.-Blk.-Red 2nd IF Plate Decoup.
99	1000Ω	½	A102	BTS-1000	Br.-Blk.-Red Limiter Decoup.
100	47KΩ	½	R473	BTA-47K	Yl.-Vi.-Or. Diode Filter
101	47KΩ	½	R473	BTS-47K	Yl.-Vi.-Or. Diode Filter
102	330KΩ	½	A334	BTS-330K	Or.-Or.-Yl. Diode Load
103	47KΩ	1	R473	BTA-47K	Yl.-Vi.-Or. Limiter Decoupling
104	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. De-emphasis
105	470KΩ	½	A474	BTS-470K	Yl.-Vi.-Yl. FM Diode Load
106	470KΩ	½	A474	BTS-470K	Yl.-Vi.-Yl. " " "
107	150KΩ	½	A154	BTS-150K	Br.-Grn.-Yl. Tone Comp.
108	100KΩ	½	A104	BTS-100K	Br.-Blk.-Yl. " "
109	300Ω	½	A301	BW-2-300	Or.-Blk.-Br. 1st AF Cathode
110	68K	½	A683	BTS-68K	Blue-Gray-Or. Tone Control
111	470K	½	A474	BTS-470K	Or.-Or.-Yl. Phono Shunt

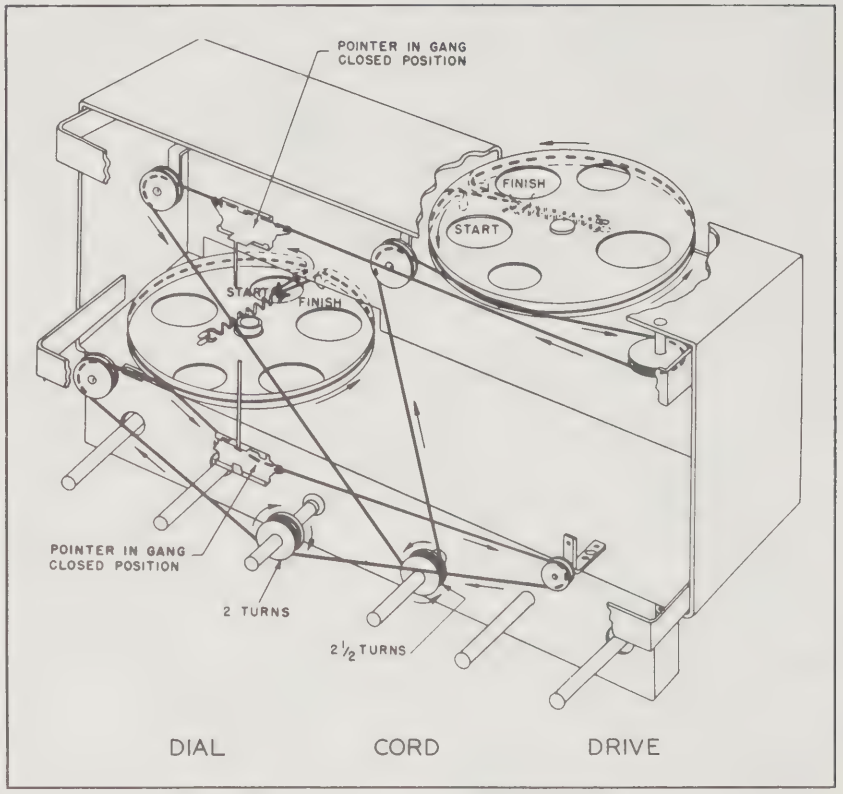
PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

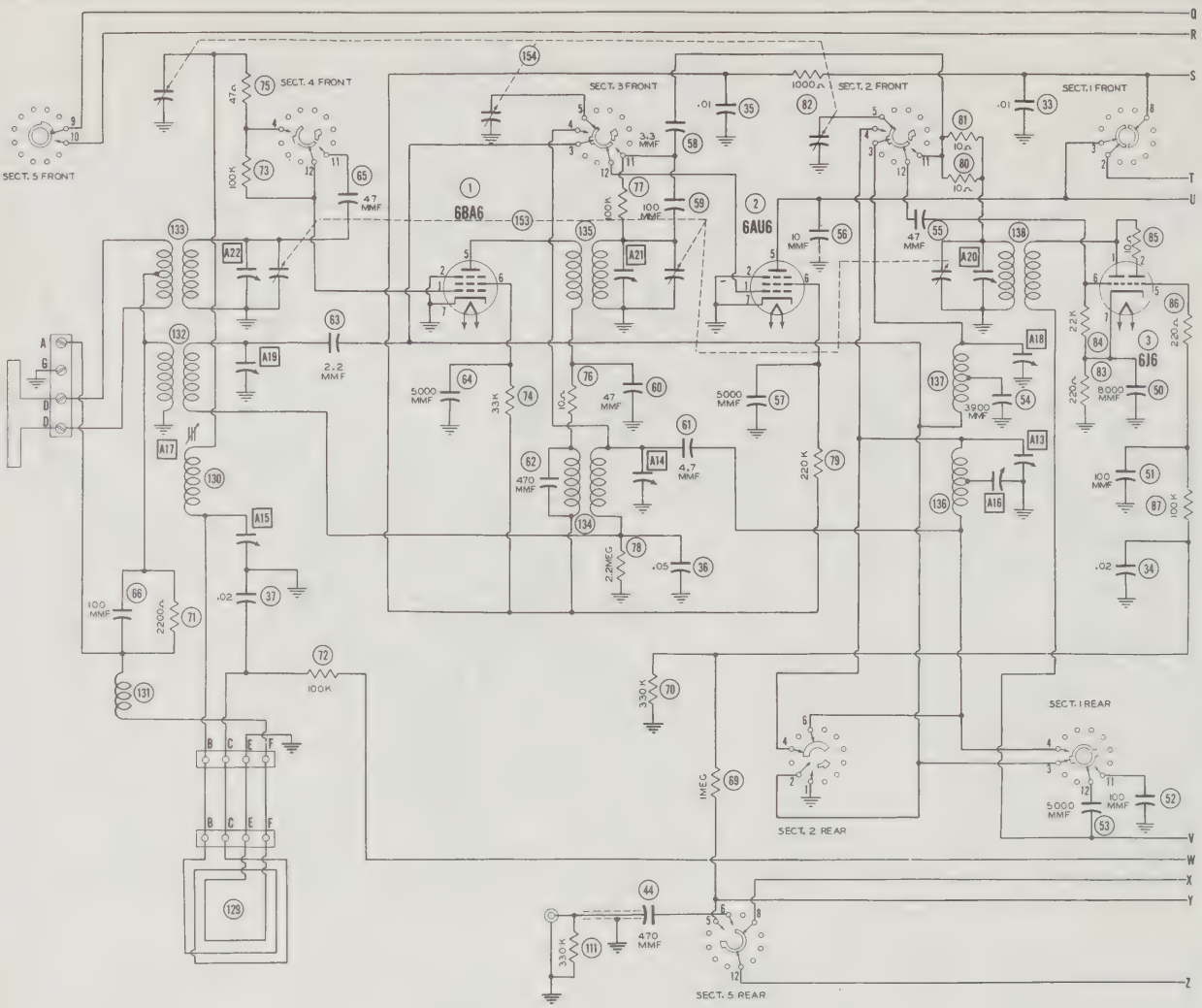
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					DELCO PART No.		
146-143	Bayonet	6-8	0.25	Blue	187189		Type 44

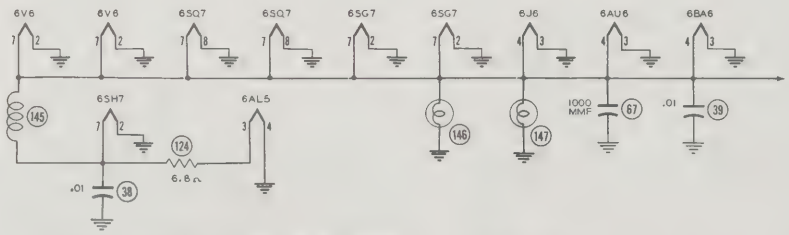
MISCELLANEOUS

ITEM No.	PART NAME	DELCO PART No.	NOTES
149	Switch	1217977	Muting
150	"	1218369	Band
151	"	1218358	Power
152	"	1218359	Tone
153	3 Gang Var. Cap.	1217716	FM
154	" " " "	1217717	AM (12-475MF) each section
	Trimmer Assby.	1218365	A13, A14, A15, A16, A18, A19
A20	Trimmer	1218352	FM Osc. Adj.
A21	"	1217705	FM RF Adj.
A22	"	1217707	FM Ant. Adj.
	Dial Pointer	1218357	FM
	" "	1218363	AM
	Dial Glass	1217935	Upper
	" "	1217932	Lower



DATE 10/48-#4817-7 Sec. #47-FOLDER #7





VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1			0V.	0V.	6.6VAC	260VDC	127VDC	0V.	-
2			0V.	0V.	6.6VAC	285VDC	80VDC	0V.	-
3			200VDC	0V.	6.6VAC	0V.	-16VDC‡	1.7VDC	-
4					-.6VDC	0V.	111VDC	6.6VAC	262VDC
5							142VDC	6.6VAC	260VDC
6A								.6VAC	0V.
4								3.6VAC	
7				4.8VAC	0V.	.2VDC	0V.	-.2VDC	
8				1.4VDC	0V.	0V.	125VDC	6.6VAC	
9				1.7VAC	0V.	0V.	165VDC	6.6VAC	
10				365VDC	330VDC	0V.	0V.	6.6VAC	
11				355VDC	330VDC	0V.	0V.	6.6VAC	
12			360VDC	0V.	340VAC	0V.	340VAC	0V.	

‡TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1									-
2			0Ω	0Ω				1Ω	-
3									-
4	6SQ7		0Ω	0Ω	1.5 MEG				
5	6SG7	0Ω	0Ω	220Ω	9.5Ω				
6A	6SH7	0Ω	0Ω	0Ω	420KΩ	0Ω	INF.	.05Ω	INF.
4	6SH7			0Ω	420KΩ	0Ω	122KΩ	.05Ω	122KΩ
7	6AL5		1 MEG.			0Ω			
8	6SQ7		2 MEG.	300Ω	0Ω	0Ω	540KΩ		
9	6SG7		1 MEG.	2.5KΩ	0Ω	0Ω	210KΩ		
10	6V6GT				70KΩ	430KΩ	100KΩ		
11	6V6GT						INF.		
12	6V6GT	INF.		INF.		INF.		INF.	

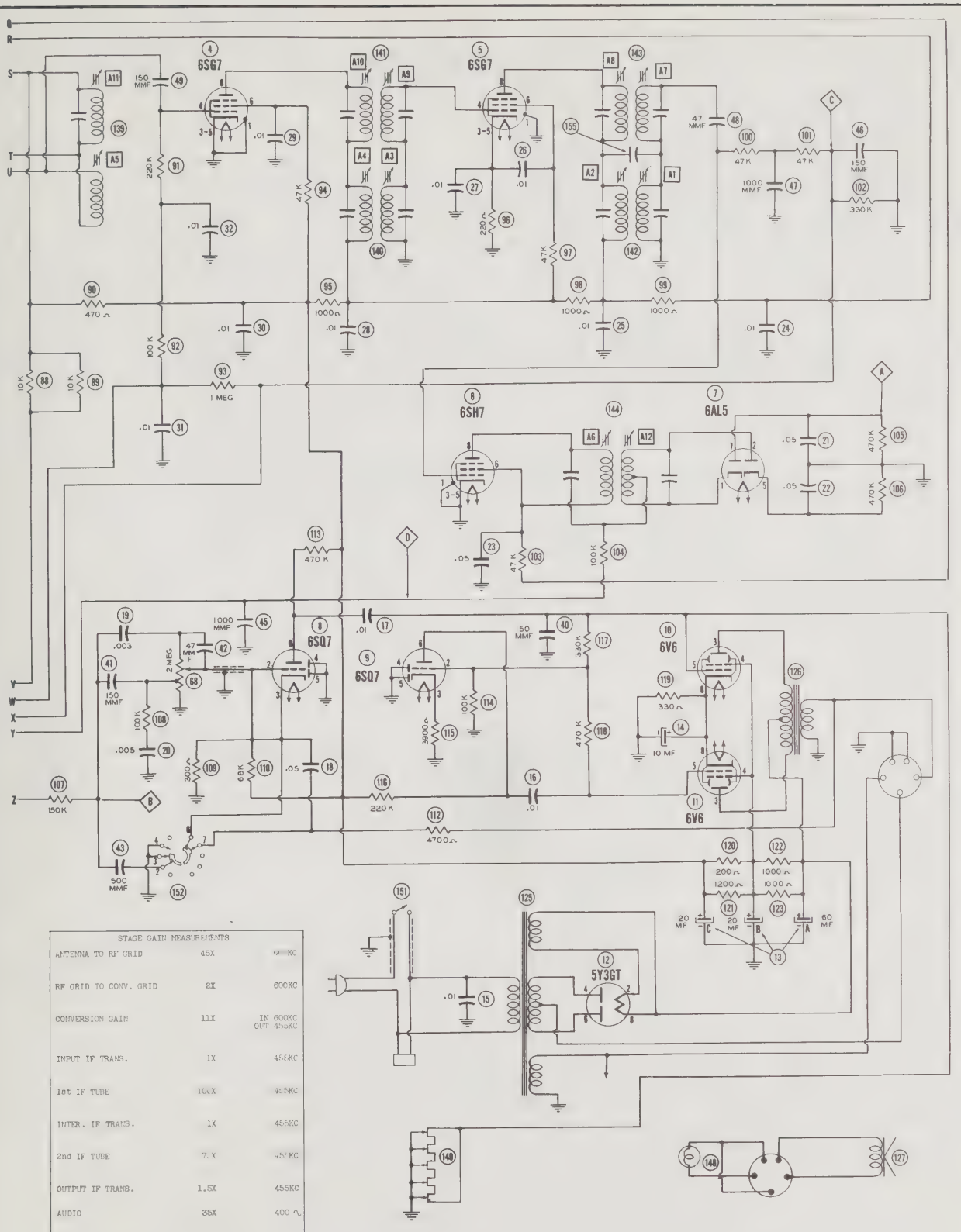
‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948



STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	45X	[illegible] KC
RF GRID TO CONV. GRID	2X	600KC
CONVERSION GAIN	11X	IN 600KC OUT 455KC
INPUT IF TRANS.	1X	455KC
1st IF TUBE	100X	455KC
INTER. IF TRANS.	1X	455KC
2nd IF TUBE	7.X	455KC
OUTPUT IF TRANS.	1.5X	455KC
AUDIO	35X	400 ∿
OUTPUT	20X	400 ∿

IF = 455KC AM

IF = 10.7MC FM

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use scales on dial pointer rails for calibration purposes. These are accessible after dial backplate has been removed. With tuning cap. fully closed set right edges of dial pointer saddles to "0" on both scales.

Standard RMA dummy antenna consists of 200MMFD cap. in series with a 20 microhenry RF choke with choke shunted by a 400 MMFD cap. in series with a 400Ω carbon resistor.

Use insulated alignment screwdriver for all adjustments.

If VTVM is not available, a 20KΩ/volt DC voltmeter may be used.

FM IF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD.	High side to stator of center section of AM tuning cap. Low side to chassis.	455KC	BC (1 position clockwise)	Mid position of calibration strip.	Across voice coil.	A1,A2, A3,A4, A5	Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
2	.01 MFD.	High side to stator of center section of FM tuning cap. Low side to chassis.	10.7MC (Unmodulated)	FM (2 positions clockwise)	FM calibration strip #55.	DC probe to Point ⊕. Common to chassis.	A6,A7, A8,A9, A10, A11	Adjust for maximum deflection.
3	.01 MFD.	"	"	"	"	DC probe to Point ⊖. Common to ground.	A12	Adjust for zero deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
2	.01 MFD	High side to Pin 4 (grid) of 6SG7 1st IF Tube (4). Low side to chassis.	10.7MC (Freq. Mod.)	FM (2 pos. clockwise)	FM calibration Strip #55.	Vertical input to Point ⊕. Ground to chassis.	A7,A8, A8,A10	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
3	.01 MFD	High side to stator of center section of FM tuning cap. Low side to chassis.	"	"	"	"	A11	"
4	.01 MFD	High side to Pin 4 (grid) of 6SG7 1st IF Tube (4). Low side to chassis.	"	"	"	Vertical input to Point ⊕. Ground to chassis.	A6, A12	Alternately adjust A6 for maximum amplitude and A12 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2.

RF ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5	RMA Dummy	High side to terminal "A" on ant. terminal strip. Low side to chassis.	1500KC	BC	AM calibration strip #82.	Across voice coil.	A17	Adjust for maximum output.
6	"	"	"	"	Tune for maximum output.	"	A14, A15	Adjust for maximum output.
7	"	"	600KC	"	AM calibration strip, #1...	"	A16	" " " "
8	"	"	"	"	Tune for maximum output.	"	A17	Adjust for maximum output. Repeat Steps 5, 6, 7 & 8 until no further improvement can be made.
9	"	"	16MC	SW (fully counter-clockwise)	AM calibration strip #84.	"	A18	Adjust for maximum output.
10	"	"	"	"	Tune for maximum output.	"	A19	Rock tuning cap. and adjust for maximum output.
						CONNECT VTVM		
11	2 15Ω carbon res.	Each side to "D" terminal on ant. terminal strip.	108MC (Unmodulated)	FM	FM calibration strip #83.5	DC probe to Point ⊕. Common to chassis.	A20	Adjust for maximum deflection.
12	"	"	"	"	Tune for maximum output.	"	A21, A22	" " " "

FIG. 1

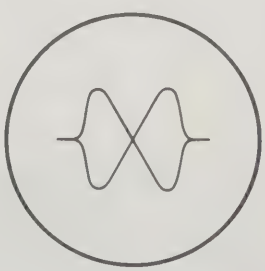


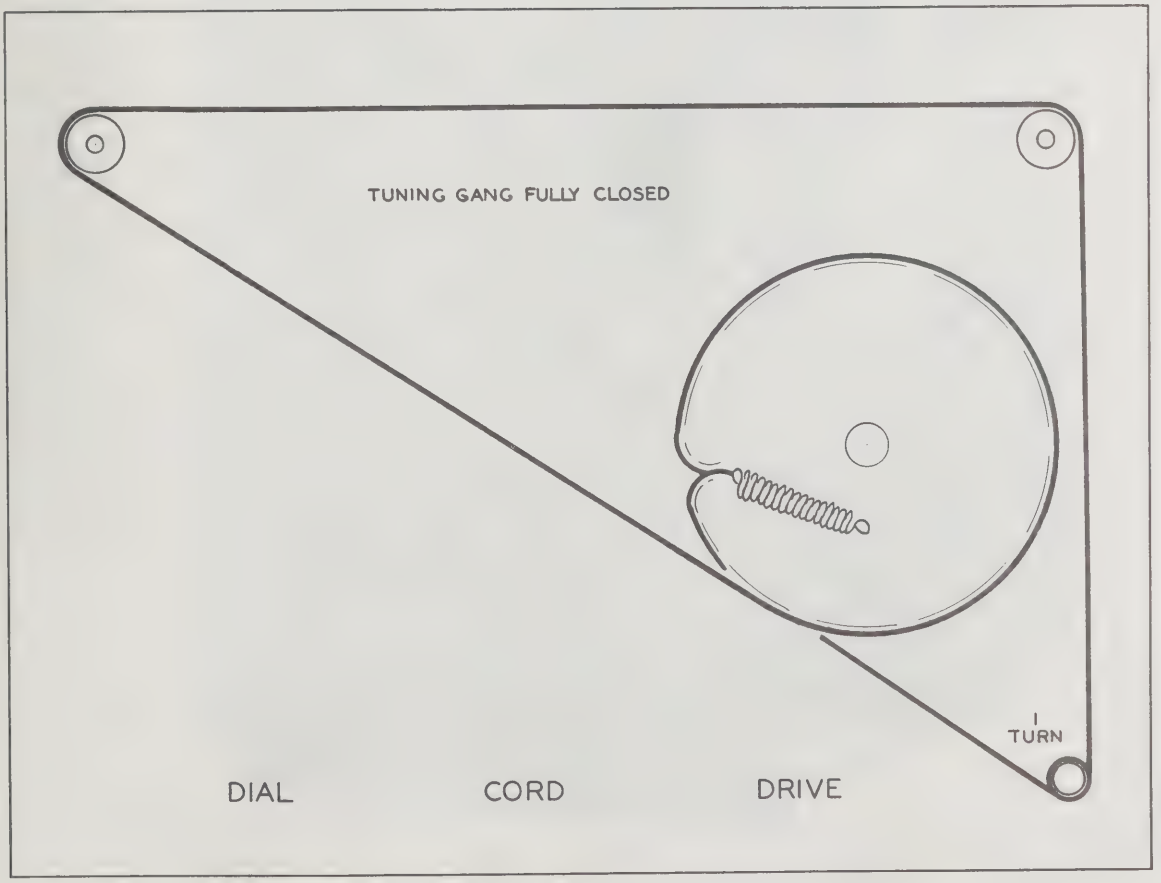
FIG. 2

ESPEY CHASSIS MODEL
7B

ESPEY CHASSIS MODEL 7B

TRADE NAME	Espey, Chassis Model 7B
MANUFACTURER	Espey Mfg. Co., Inc., 528 E. 72nd St., New York, N.Y.
TYPE SET	AC Operated AM-FM Superheterodyne Receiver with Loop Antenna
TUBES (ELEVEN)	Types, 6BA6 FM RF Amp., 7Q7 AM Converter, 7F8 FM Converter, 7AH7 IF Amp., 6SH7 FM 2nd IF Amp., 7A6 FM Ratio Det., 6SQ7 Det.-AVC-AF, 7F7 2nd AF Phase Inv., (2) 7C5 Power Output, 5Y3GT Rectifier.
POWER SUPPLY	105-125 Volts AC
RATING	.8 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1700KC FREQ. MOD. 88-108MC

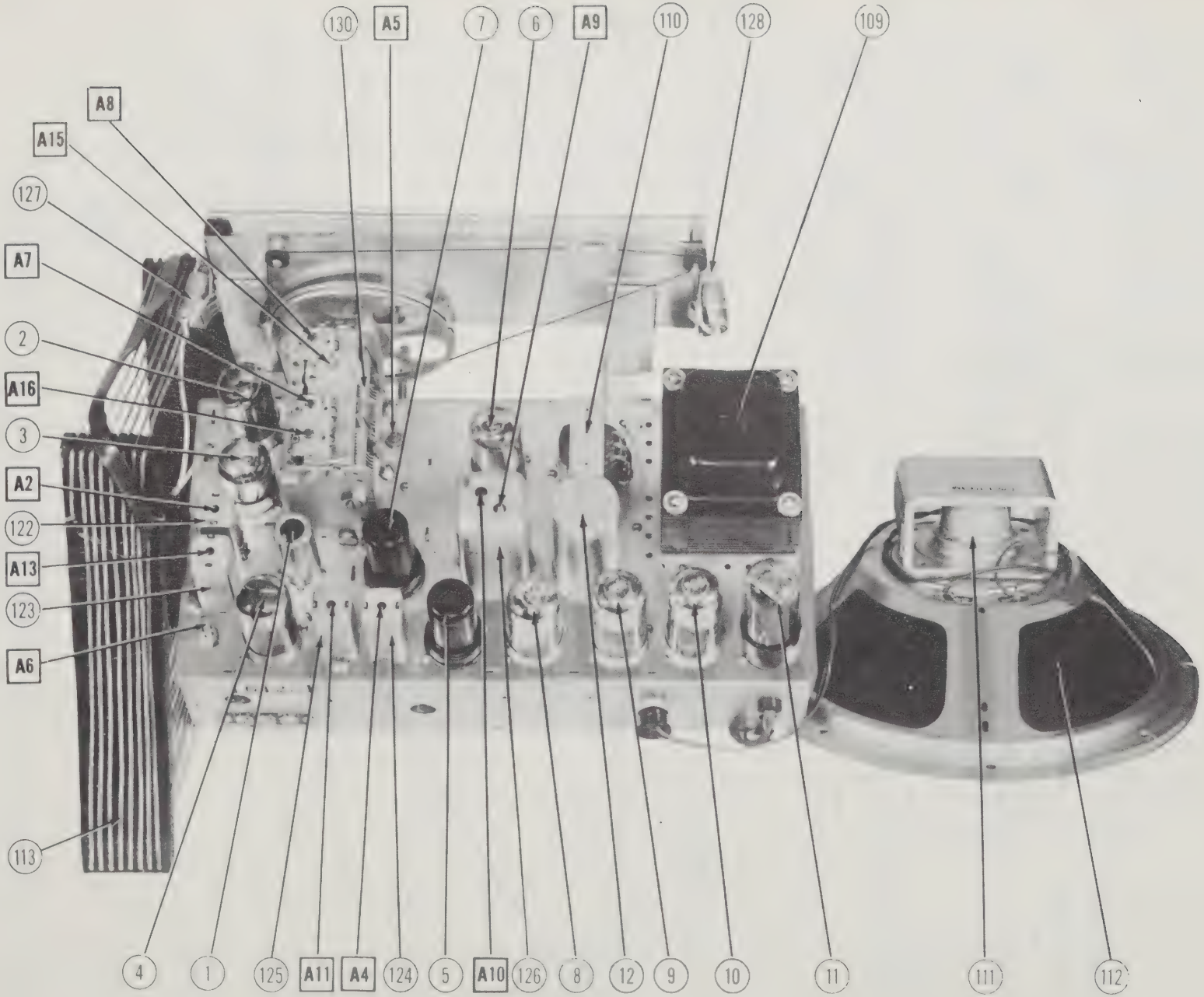
ESPEY CHASSIS MODEL
7B



HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 10/48-#4817-8 SET #47-FOLDER #8


130
A5
7
6
A9
110
128
109
A8
A15
127
A7
2
A16
3
A2
122
A13
123
A6
113
4
1
125
A11
A4
124
5
A10
126
8
12
9
10
11
111
112

ESPEY CHASSIS MODEL 7B

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6BA6	6BA6	7PK	
2	AM Converter	7A7	7A7	8AL	
3	FM Converter	7F8	7F8	8BW	
4	IF Amp.	7AH7	7AH7		
5	FM 2nd IF	6SH7	6SH7	8BK	
6	FM Ratio Det.	7A6	7A6	7AJ	
7	Det.-AVC-AF	6SQ7	6SQ7	8Q	
8	2nd Audio Phase Inv.	7F7	7F7	8AC	
9	Power Output	7C5	7C5	6AA	
10	" "	7C5	7C5	6AA	
11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
12A	40	450		AF88J	UP4445	DY-2x40-450	EL-240	▲ Filter
B	40	450						"
13	8	450		PRS450/8	BR845	M-8-450	UT-8	"
14	4	450		PRS450/4	BR445	M-4-450	UT-4	Stabilizing Cap.
15	.025	400		484-03	DT4S3	MPH-6-02	TC-13	Line Filter
16	.025	400		484-03	DT4S3	MPH-6-02	TC-13	" "
17	.025	400		484-03	DT4S3	ST-6-03	TC-13	Audio Coupling
18	.025	400		484-03	DT4S3	ST-6-03	TC-13	" "
19	.05	200		484-05	DT2S5	ST-4-05	TC-15	" "
20	.02	200		484-02	DT2S2	ST-4-02	TC-12	Tone Comp.
21	.05	200		484-05	DT2S5	ST-4-05	TC-15	Audio Coupling
22	.5	200		484-.5	DT2P5	ST-2-5	TC-5	Bias Filter
23	.01	150		484-01	DT2S1	ST-4-01	TC-11	2nd IF Cathode Bypass
24	.1	200		484-.1	DT2P1	ST-2-1	TC-1	AVC Filter
25	.02	400		484-02	DT4S2	ST-4-02	TC-12	RF Bypass Power Supply
26	.02	400		484-02	DT4S2	ST-4-02	TC-12	Decoupling
27	2000			1467-002	1W5D2	MW.5-22	1FM-22	Output Plate Bypass
28	2000			1467-002	1W5D2	MW.5-22	1FM-22	" " "
29	250			1468-00025	5W5T25	MO.5-325	1FM-325	Tone Compensation
30	250			1468-00025	5W5T25	MO.5-325	1FM-325	Tone Comp.
31	5000			1467-005	1D5D5	MW.5-25	1FM-25	" "
32	6800			1467-006	1D3D7	MW.3-27	1FM-27	Audio Coupling
33	250			1468-00025	5W5T25	MO.5-325	1FM-325	Ratio Det. Load Cap.
34	3000			1467-003	1W5D3	MW.5-23	1FM-23	De-emphasis
35	1500			1467-0015	1W5D15	MW.5-215	1FM-215	2nd IF Plate Decoupling-Cer.
36	1500			1467-0015	1W5D15	MW.5-215	1FM-215	2nd IF Screen Byp.-Cer.
37	1500			1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass-Cer.
38	100			1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
39	100			1468-0001	5W5T1	MO.5-31	1FM-31	" " "
40	1500			1468-0015	1W5D15	MW.5-215	1FM-215	AVC Filter-Cer.
41	6800			1467-006	1D3D7	MW.3-27	1FM-27	1st IF Decoupling
42	1500			1467-0015	1W5D15	MW.5-215	1FM-215	1st IF Cathode Byp.-Cer.
43	1500			1467-0015	1W5D15	MW.5-215	1FM-215	FM Conv. Plate Decoup.-Cer.
44	1500			1467-0015	1W5D15	MW.5-215	1FM-215	FM Osc. Plate Decoup.-Cer.
45	25			1468-000025	5W5Q25	MO.5-425	MS-425	Osc. Grid Cap.
46	2							Osc. Coupling-Cer.
47	1500			1467-0015	1W5D15	MW.5-215	1FM-215	Conv. Cathode Bypass-Cer.
48	1500			1467-0015	1W5D15	MW.5-215	1FM-215	RF Coupling-Cer.
49	47			1468-00005	5W5Q5	MO.5-45	1FM-45	" " "
50	1500			1467-0015	1W5D15	MW.5-215	1FM-215	RF Decoupling-Cer.
51	1500			1467-0015	1W5D15	MW.5-215	1FM-215	RF Screen Bypass-Cer.
52	1500			1467-0015	1W5D15	MW.5-215	1FM-215	RF Cathode Bypass-Cer.
53	500			1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling
54	1500			1467-0015	1W5D15	MW.5-215	1FM-215	Filament Bypass-Cer.
55	1500			1467-0015	1W5D15	MW.5-215	1FM-215	" " "
56	1500			1467-0015	1W5D15	MW.5-215	1FM-215	" " "
57	100			1468-0001	5W5T1	MO.5-31	1FM-31	Phono Tone Comp.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: STANCOR PART No.	REPLACEMENT DATA: THORDAR'N PART No.	REPLACEMENT DATA: MERIT PART No.	INSTALLATION NOTES
110	4000Ω CT	3.6Ω	540Ω CT	.4Ω	ZA-15.019	A-3823	T22S60‡	A-2901	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-119*		*Replace output transformer to match 6-8 voice coil.
111	PM	3.6Ω	LS-13939	Mod. P10-T	10A31	
	CONE DIA.	VC DIA.				
112	9½"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA: MEISSNER PART No.	
113	BC Ant.Loop		.3Ω	LA-5.018		
114	FM Di-pole Ant.			LA-5.010		
115	BC Loop Load.Coil		2.2Ω	LA-2.273	14-1056	
116	FM Ant.Coil	0Ω	0Ω	LA-2.241		
117	FM RF Plate Coil		.5Ω	LA-2.279		
118	FM RF Coil		0Ω	LA-2.243		
119	FM Conv. Plate Coil		.1Ω	LA-2.242		
120	BC Osc.Coil	.3Ω	5.5Ω	LA-2.221	14-1060†	†Add 50 MMFD cap. from high side tuning cap. to osc. grid.
121	FM " "	0Ω	0Ω	LA-2.222		
122	AM 1st IF	16Ω	16Ω	ZB-2.275	16-6678	
123	FM " "	.7Ω	.7Ω	ZB-2.276		
124	AM 2nd IF	16Ω	16Ω	ZB-2.275	16-6678	
125	FM " "	.7Ω	.7Ω	ZB-2.276		
126	FM Det. Trans.	.8Ω	.2Ω	ZC-2.278		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: ESPEY PART No.	REPLACEMENT DATA	INSTALLATION NOTES
127	Bayonet	6-8	0.15	Brown			Type 47
128	"	6-8	0.15	"			" "

MISCELLANEOUS

ITEM No.	PART NAME	ESPEY PART No.	NOTES
129	Switch	SA-12.060	Band
130	Tuning Gang	C-6-042	(50-500MMF, 50-500MMF)

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	ESPEY PART No.	IRC PART No.	CLAROSTAT PART No.	
58A	500KΩ	½	RA-9.069	D18-133X	T-88	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 58A per instructions
59A	1 Meg.	½	RA-9.070	D13-137	M-63-Z	Tone Control
B	Shaft		Not Req.	A	Not Req.	Attach to 59A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ESPEY PART No.	IRC PART No.	
60	100Ω	½			Br.-Blk.-Br. RF Cathode
61	22KΩ	½		BTS-22K	Red-Red-Or. RF Screen
62	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. FM Conv. Grid
63	47Ω	½			Yl.-Vi.-Blk. FM Conv. Cathode
64	470Ω	½		BTS-470	Yl.-Vi.-Br. FM Conv. Cathode
65	2000Ω	½		BTS-2200	Red-Red-Red FM Conv. Plate Decoup.
66	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
67	2200Ω	½		BTS-2200	Red-Red-Red FM Osc. Plate Decoup.
68	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AM Conv. Grid
69	1200Ω	½		BTS-1200	Br.-Red-Red Ant. Loading
70	15KΩ	2		BT-2-15K	Br.-Grn.-Or. AM Conv. Decoupling
71	22KΩ	½		BTS-22K	Red-Red-Or. AM Osc. Grid
72	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
73	2.4 Meg.	½		BTS-2.2 Meg.	Red-Yl.-Grn. " "
74	100Ω	½			Br.-Blk.-Br. 1st IF Cathode
75	2000Ω	½		BTS-2000	Red-Blk.-Red 1st IF Decoupling
76	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Diode Filter
77	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Diode Load
78	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. AVC Network
79	220KΩ	½		BTS-220K	Red-Red-Yl. " "
80	100Ω	½			Br.-Blk.-Br. 2nd IF Cathode
81	22KΩ	½		BTS-22K	Red-Red-Or. 2nd IF Screen
82	1200Ω	½		BTS-1200	Br.-Red-Red 2nd IF Plate Decoupling
83	22KΩ	½		BTS-22K	Red-Red-Or. De-emphasis
84	12KΩ	½		BTS-12K	Br.-Red-Or. Ratio Det. Diode Load
85	12KΩ	½		BTS-12K	Br.-Red-Or. " " " "
86	220KΩ	½		BTS-220K	Red-Red-Yl. AVC Network
87	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Bias Network
88	100KΩ	½		BTS-100K	Br.-Blk.-Yl. AVC Network
89	22KΩ	½		BTS-22K	Red-Red-Or. Tone Comp.
90	10KΩ	½		BTS-10K	Br.-Blk.-Or. " "
91	6.8 Meg.	½		BTS-6.8 Meg	Blue-Gray-Grn. 1st AF Grid
92	220KΩ	½		BTS-220K	Red-Red-Yl. 1st AF Plate Load
93	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Tone Comp.
94	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd AF Grid
95	2000Ω	½		BTS-2200	Red-Blk.-Red 2nd AF Cathode
96	15Ω	½		BW-½-15	Br.-Grn.-Blk. " " "
97	220KΩ	½		BTS-220K	Red-Red-Yl. 2nd AF Plate Load
98	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inverter Plate Load
99	10KΩ	½		BTS-10K	Br.-Blk.-Yl. Phase Inverter Cathode
100	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Phase Inverter Grid
101	2000Ω	½		BTS-2200	Red-Blk.-Red Decoupling
102	220KΩ	½		BTS-220K	Red-Red-Yl. Output Grid
103	220KΩ	½		BTS-220K	Red-Red-Yl. " "
104	200Ω	2		BW-2-220	Red-Blk.-Br. Output Cathode
105	100Ω	½		BW-½-100	Br.-Blk.-Br. Feedback
106	2200Ω	10		AB-2250	Filter
107	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Phono Tone Comp.
108	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Phono Shunt

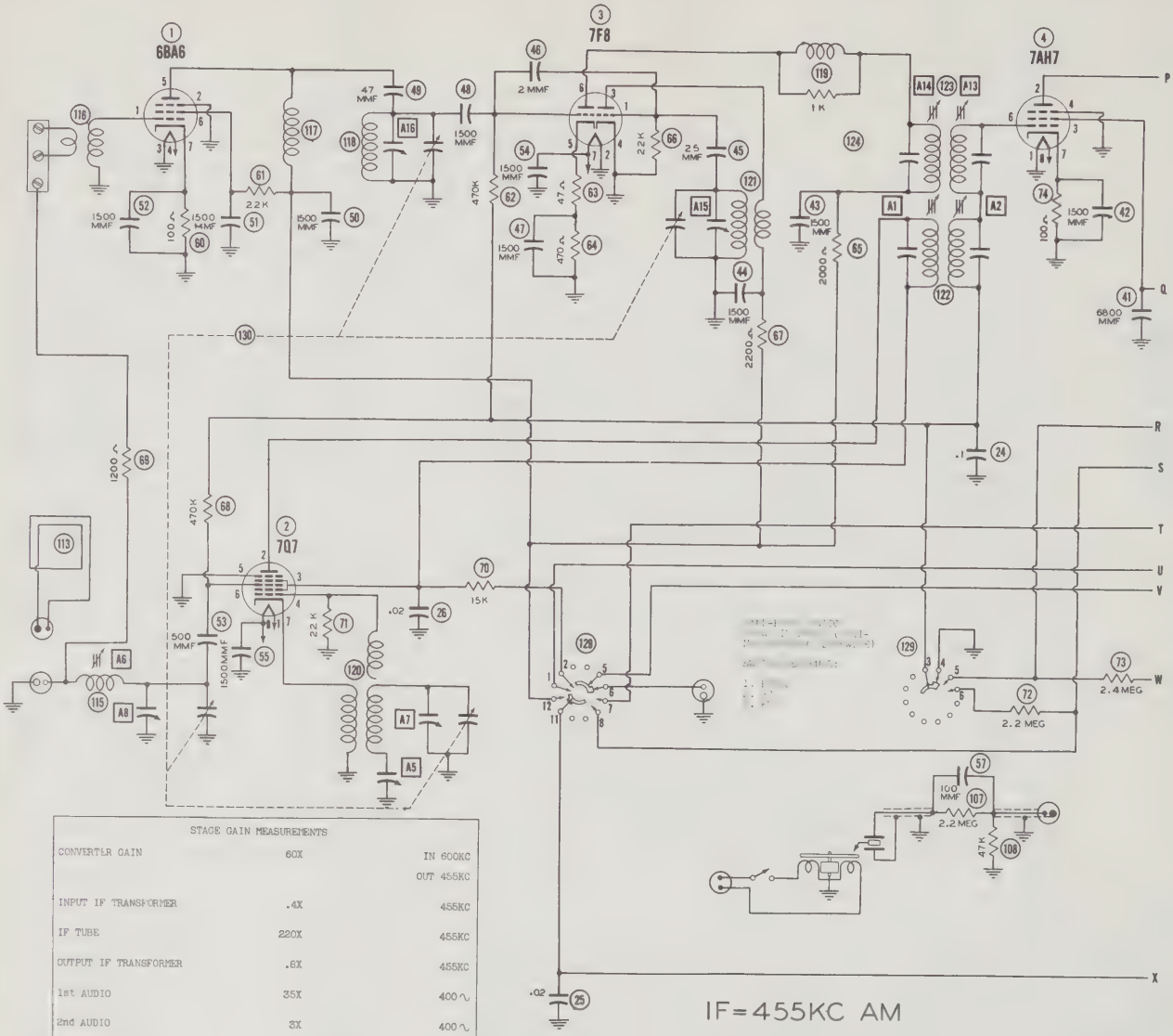
TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	ESPEY PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
109	117V AC @ .8A	660V CT .102A DC	5.0V AC @ 2.0A	5.0V AC @ 3.2A	ZA-18.053	P-6013#	T-22R05	P-2063#

#Add series resistor to reduce plate voltage.

DATE 10/48-#4017-8 SEC #47-FOLDER #8

ESPEY CHASSIS MODEL
7B
PAGE 5



STAGE GAIN MEASUREMENTS

CONVERTER GAIN	60X	IN 600KC OUT 455KC
INPUT IF TRANSFORMER	.4X	455KC
IF TUBE	220X	455KC
OUTPUT IF TRANSFORMER	.6X	455KC
1st AUDIO	35X	400 ∿
2nd AUDIO	3X	400 ∿
PHASE INVERTER	.6X	400 ∿
OUTPUT	30X	400 ∿

IF=455KC AM

IF=10.7MC FM

.025 (15)

SW. ON TONE CONT.

.025 (16)

VOLTAGE READINGS

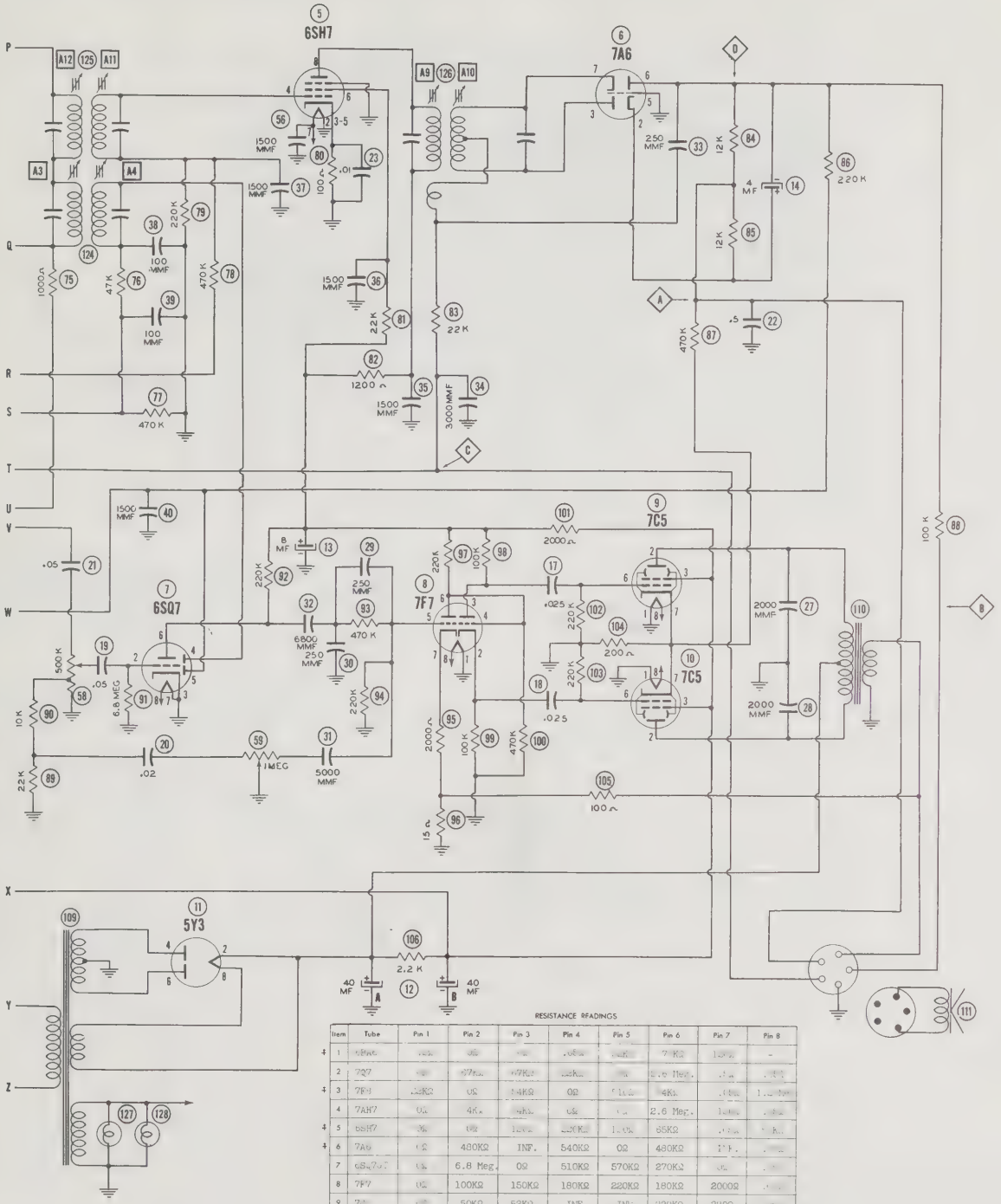
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6BA6	0V.	0V.	0V.	6.3VAC	213VDC	108VDC	1.8VDC	-
2	7Q7	0V.	95VDC	95VDC	-9.5VDC§	0V.	0V.	0V.	6.3VAC
‡ 3	7F8	-5VDC§	0V.	195VDC	0V.	2.9VDC	200VDC	6.3VAC	0V.
4	7AH7	0V.	38VDC	38VDC	0V.	0V.	0V.	1.3VDC	6.3VDC
‡ 5	6SH7	0V.	0V.	1.3VDC	0V.	1.3VDC	130VDC	6.3VDC	180VDC
‡ 6	7A6	0V.	2.6VDC	2.2VDC	-.2VDC	0V.	.6VDC	2.2VDC	6.3VAC
7	6S7GT	0V.	-.5VDC	0V.	-.3VDC	-.1VDC	105VDC	0V.	6.3VAC
8	7F7	0V.	80VDC	163VDC	78VDC	0V.	78VDC	1VDC	6.3VAC
9	7C5	0V.	330VDC	250VDC	0V.	0V.	0V.	15VDC	6.3VAC
10	7C5	0V.	330VDC	250VDC	0V.	0V.	0V.	15VDC	6.3VAC
11	5Y3GT	0V.	335VDC	0V.	330VAC	0V.	330VAC	0V.	335VDC

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6SH7	[illegible]	0Ω	[illegible]	.05Ω	[illegible]	2.6 MEG.	130Ω	-
2	7Q7	[illegible]	47KΩ	47KΩ	22KΩ	[illegible]	2.6 MEG.	[illegible]	[illegible]
‡ 3	7F7	22KΩ	0Ω	44KΩ	0Ω	[illegible]	4KΩ	[illegible]	1.[illegible]MEG
4	7AH7	0Ω	4KΩ	[illegible]	0Ω	[illegible]	2.6 MEG.	[illegible]	[illegible]
‡ 5	6SH7	0Ω	0Ω	130Ω	[illegible]OKΩ	1.0Ω	65KΩ	[illegible]	[illegible]
‡ 6	7A6	0Ω	480KΩ	INF.	540KΩ	0Ω	480KΩ	INF.	[illegible]
7	6S[illegible]	0Ω	6.8 Meg.	0Ω	510KΩ	570KΩ	270KΩ	[illegible]	[illegible]
8	7F7	0Ω	100KΩ	150KΩ	180KΩ	220KΩ	180KΩ	2000Ω	[illegible]
9	7[illegible]	0Ω	50KΩ	52KΩ	INF.	INF.	220KΩ	220Ω	[illegible]
10	7[illegible]	0Ω	50KΩ	52KΩ	INF.	INF.	220KΩ	[illegible]	[illegible]
11	5Y3GT	INF.	50KΩ	INF.	130Ω	INF.	130Ω	INF.	[illegible]

‡TAKEN WITH VACUUM TUBE VOLTMETER.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

©Howard W. Sams & Co., Inc. 1948

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to front AM stator of tuning cap. Low side to chassis.	455KC	AM (fully clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output.
2	200MMFD.	High side to ext ant. terminal. Low side to chassis.	600KC	"	600KC	"	A5,A6	" " " "
3	200MMFD.	"	1600KC	"	1600KC	"	A7	" " " "
4	200MMFD.	"	"	"	Tune for maximum output.	"	A8	Adjust for maximum output. Repeat Steps 2, 3 and 4 until no further improvement can be made.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR, VTVM & OUTPUT METER

In Step 6 after adjustment of A10 for zero deflection tune signal generator 200KC above 10.7MC and note meter reading. Then tune signal generator 200KC below 10.7MC and note the meter reading. These two readings should be about equal. If they are not then A9 should be readjusted until the two readings are approximately equal.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01 MFD.	High side to Pin 4 (grid) of 6SH7. Low side to chassis.	10.7MC (Unmodulated)	FM (Center position)	Tuning cap. fully open.	DC probe to Point D. Common to Point A.	A9	Adjust for maximum deflection.
6	.01 MFD.	"	"	"	"	DC probe to Point C. Common to Point A.	A10	Use a zero center scale VTVM if available and adjust for maximum output. Check linearity per pre-alignment notes.
						OUTPUT METER		
7	.01 MFD.	High side to Pin 6 (grid) of 7AH7. Low side to chassis.	10.7MC (400 ∿ 30% amplitude mod.)	"	"	Across voice coil	A11, A12	Connect 1000Ω carbon res. across primary of ratio detector transformer (122). Adjust A11 & A12 for maximum output.
8	.01 MFD.	High side to Pin 8 (grid) of 7F8. Low side to chassis.	"	"	"	"	A13, A14	Adjust for maximum output. Remove 1000Ω resistor. Continue with FM-RF Alignment in Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
5	.01 MFD.	High side to Pin 6 (grid) of 7AH7. Low side to chassis.	10.7MC (Freq. Mod.)	FM (center position)	Tuning cap. fully open.	Vertical input to Point D. Ground to Point A.	A9,A11 A12	Disconnect 4 MFD cap. from Point D. Adjust A9, A11 & A12 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD.	Disconnect cap. (48) from Pin 8 (grid) of 7F8. High side of sig. gen. to Pin 8. Low side to chassis.	"	"	"	"	A13, A14	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Reconnect 4 MFD cap. to Point D and cap. (48) to Pin 8 of 7F8.
7	.01 MFD.	High side to Pin 6 (grid) of 7AH7. Low side to chassis.	"	"	"	Vertical input to Point C. Ground to chassis.	A10	Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 9.

FIG. 1

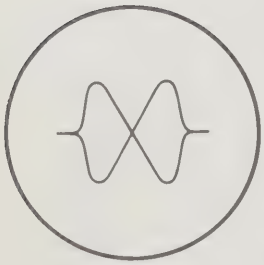


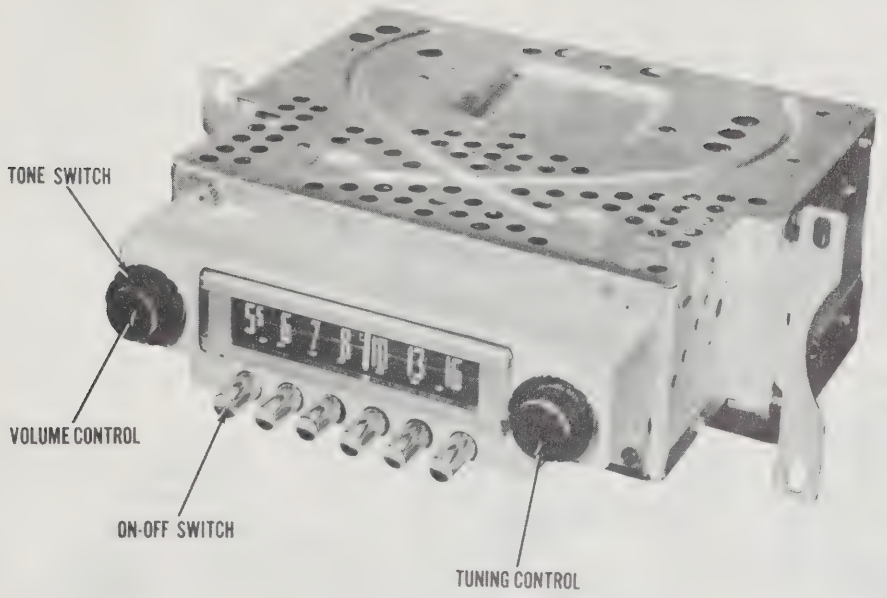
FIG. 2

FM RF ALIGNMENT

Attenuate output of signal generator to maintain maximum meter deflection of 2 volts.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	2 - 150Ω carbon res.	Each side to FM dipole terminal.	108MC (Unmodulated)	FM	108MC	DC probe to Point B. Common to Point A.	A15	Adjust for maximum deflection.
10	"	"	"	"	Tune for maximum deflection.	"	A16	Adjust for maximum deflection. Repeat Steps 9 & 10 until no further improvement can be made.
11	"	"	90MC	"	"	"	FM-RF Coil (115)	Compress or expand turns slightly for maximum deflection. Repeat Steps 9,10 & 11 until no further improvement can be made.

FORD MODEL 8MF881
(8C-18805B)



FORD MODEL 8MF881

TRADE NAME	Ford, Model 8MF881 (8C-18805B)
SUPPLIER	Ford Motor Car Co., Detroit, Mich.
TYPE SET	Battery Operated Custom Built Ford Truck Superheterodyne Receiver
TUBES (EIGHT)	Types, 7A7 RF Amp., 7B8 Converter, 6BA6 IF Amp., 7E6 or 6SR7 Det.-AVC-AF, 7AF7 AF-Phase Inv., (2) 6V6GT Power Output, 7Y4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1600KC RATING 7.8 Amp. @ 6.3 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Dummy ant. consists of a 23MMFD capacitor in series with a 27MMFD capacitor shunted across output of signal generator with 23 MMFD capacitor connected to high side of signal generator. Connect antenna socket to junction of the two capacitors. These values of capacitors must be used to insure proper tracking when receiver is installed in car.

If calibration is off after completing adjustments it can be corrected with adjustment screw at pivot end of pointer arm.

If cores are adjusted, apply speaker cement to core screws.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) of 7B8. Low side to chassis.	265KC	Tuning slugs fully out.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	See pre-alignment notes	See prealignment notes.	535KC	535KC	"	A5	" " " "
3	"	"	1200KC	Tune for maximum output.	"	A6,A7, A8	" " " "
	The following procedure should be followed only when a core or coil has been replaced.						
4	See pre-alignment notes	See prealignment notes.	1700KC	Tuning slugs fully out.	Across voice coil	A5,A6, A7,A8	Screw the cores completely out of the antenna, RF, converter and oscillator coils. Adjust A5, A6, A7 and A8 for maximum output. Replace cores to their approximate original positions.
5	"	"	1200KC	1200KC	"	A9	Adjust for maximum output.
6	"	"	"	Tune for maximum output.	"	A10,A11, A12	" " " "
7	"	"	600KC	"	"	A13	Rock tuning control and adjust for maximum output. Check receiver at 1200KC. If weak or off calibration repeat Steps 5, 6 & 7.

After all adjustments have been made, reinstall receiver in car. Allow to warm up for at least fifteen minutes, and with antenna extended, tune in weak station near 1200KC and adjust A8 for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: ZENITH PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	7A7	7A7	8V	
2	Converter	7B8	7B8	8X	
3	IF Amp.	6BA6	6BA6	7BK	
4A	Det.-AVC-AF	7E6	7E6	8W	
B	Det.-AVC-AF	6SR7	6SR7	8Q	
5	AF-Phase Inv.	7AF7	7AF7	8AC	
6	Power Output	6V6GT	6V6GT	7AC	
7	" "	6V6GT	6V6GT	7AC	
8	Rectifier	7Y4	7Y4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: ZENITH PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	20	400	22-1484		UP2245C	DY-312	EL-322	■ Filter
B	20	400						▲ "
C	20	25						Cathode Bypass
10	20	25	22-1553	PRS25/25	BR202A	M-25-25	TA-25	" "
11	.5	120	22-1338		DT2P5	SHH-1		Hash Filter
12	.5	100	22-1728		DT2P5	SHH-1		" "
13	.007	1600	22-1713	1664-0075	MD16D7	STM-16-007	TR-27	Buffer
14	.0033	600	22-1747	684-003	DT6D3	ST-6-003	TC-23	Output Plate Bypass
15	.0033	600	22-1747	684-003	DT6D3	ST-6-003	TC-23	" " "
16	.022	600	22-1750	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
17	.022	600	22-1750	684-02	DT6S2	ST-6-02	TC-12	" "
18	.047	600	22-1749	684-05	DT6S5	ST-6-05	TC-15	" "
19	.1	400	22-1748	484-.1	DT4P1	ST-4-1	TC-1	AF Plate Decoup.
20	.005	400	22-906	484-005	DT6D5	ST-6-005	TC-25	Audio Coupling
21	.0015	600	22-1743	684-002	DT6D2	ST-6-002	TC-22	Tone Comp.
22	.01	200	22-1466	464-01	DT2S1	ST-4-01	TC-11	" "
23	.005	600	22-906	684-005	DT6D5	ST-6-005	TC-25	" "
24	.022	200	22-1751	484-02	DT2S2	ST-4-02	TC-12	AVC Filter
25	.1	400	22-170	484-.1	DT4P1	ST-4-1	TC-1	Screen Decoupling
26	.1	200	22-190	484-.1	DT2P1	ST-2-1	TC-1	Sensitivity Control Byp.
27	.0047	600	22-1752	684-005	DT6D5	ST-6-005	TC-25	Common Coupling Cap.
28	350	500	22-182	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass
29	750	500	22-242	1468-00075	1W5T7	MO.3-37	1FM-37	Tone Comp.
30	150	500	22-1137	1468-00015	5W5T15	MO.5-315	1FM-315	" "
31	100	300	22-1730	1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling-Cer.
32	100	300	22-1730	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Coupling-Cer.
33	100	300	22-1730	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.-Cer.
34	260	300	22-1712					Fixed Trimmer-Cer.
35	250	500	22-1136	1469-00025	5F5T25	MOS.5-325	MS-325	" " "
36	100	300	22-1730	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.

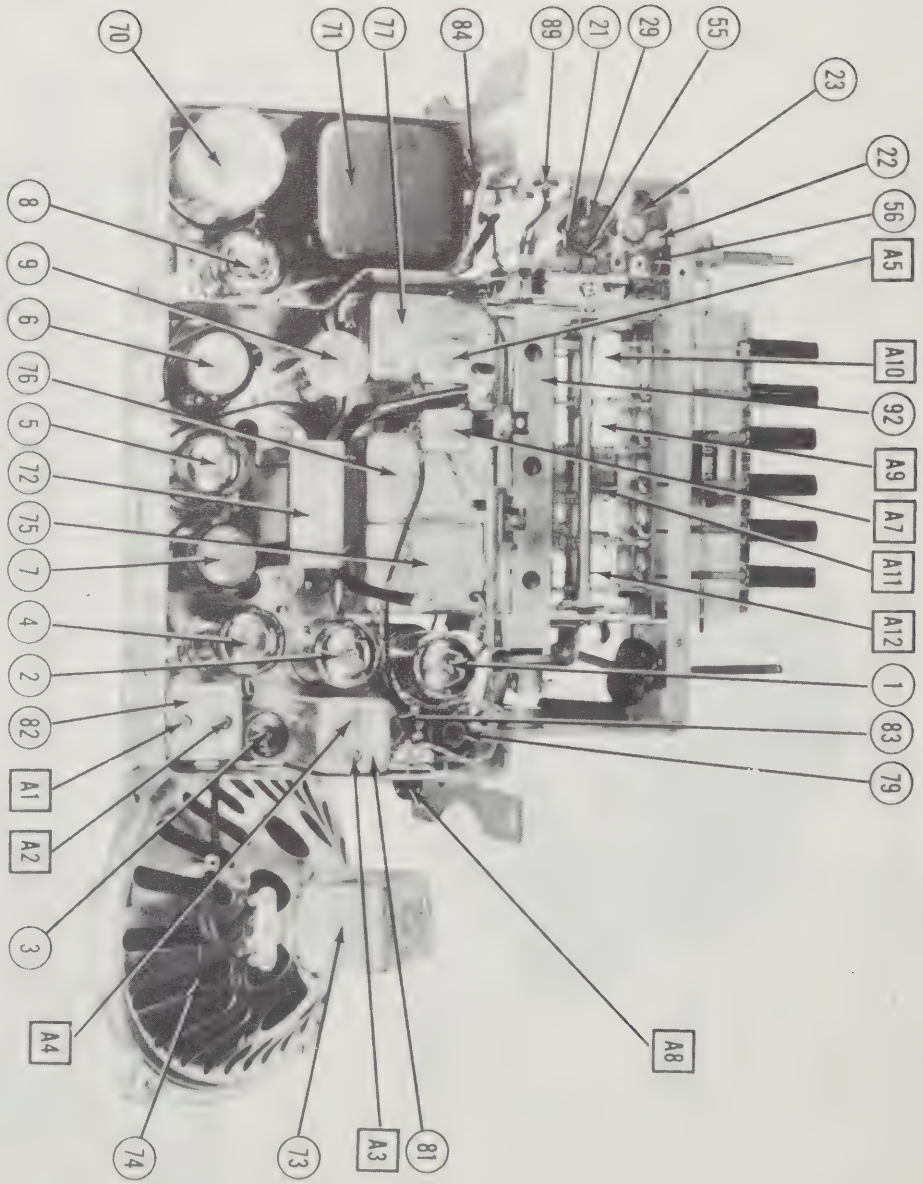
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
37A	1 Meg.	½	63-1590			Volume Control
B	Switch					Tone Switch
38	800Ω	1	63-1379			Sensitivity Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: ZENITH PART No.	IRC PART No.	IDENTIFICATION CODES
39	330KΩ	½	63-1891	BTS-330K	Or.-Or.-Yl. RF Grid
40	10KΩ	½	63-1627	BTS-10K	Br.-Blk.-Or. RF Plate Load
41	330KΩ	½	63-1891	BTS-330K	Or.-Or.-Yl. Conv. Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	ZENITH PART No.	IRC PART No.	
43	15KΩ	½	63-1835	BTS-15K	Br.-Grn.-Or. Conv. Screen Dropping
45	1 Meg.	½	63-1812	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
46	1 Meg.	½	63-1812	BTS-1 Meg.	Br.-Blk.-Grn. " "
47	470Ω	½	63-1771	BTS-470	Yl.-Vi.-Br. IF Cathode
48	33KΩ	½	63-1398	BTA-33K	Or.-Or.-Or. Screen Dropping
49	220KΩ	½	63-1884	BTS-220K	Red-Red-Yl. Tone Comp.
50	220KΩ	½	63-1884	BTS-220K	Red-Red-Yl. Diode Load
51	1500Ω	½	63-1792	BTS-1500	Br.-Grn.-Red 1st AF Cathode
52	56KΩ	½	63-1859	BTS-56K	Grn.-Blue-Or. 1st AF Plate Load
53	27KΩ	½	63-1845	BTS-27K	Red-Vi.-Or. 1st AF Plate Decoup.
54	120KΩ	½	63-1873	BTS-120K	Br.-Red-Yl. Tone Comp.
55	68KΩ	½	63-1862	BTS-68K	Blue-Gray-Or. " "
56	100KΩ	½	63-1869	BTS-100K	Br.-Blk.-Yl. " "
57	56KΩ	½	63-1859	BTS-56K	Grn.-Blue-Or. " "
58	330KΩ	½	63-1891	BTS-330K	Or.-Or.-Yl. 2nd AF Grid
59	56KΩ	½	63-1859	BTS-56K	Grn.-Blue-Or. 2nd AF Plate Load
60	1000Ω	½	63-1785	BTS-1000	Br.-Blk.-Red AF Cathode
61	30KΩ	½	63-1846	BTS-33K	Or.-Blk.-Or. Phase Inv. Grid
62	56KΩ	½	63-1859	BTS-56K	Grn.-Blue-Or. Phase Inv. Plate Load
63	330KΩ	½	63-1890	BTS-330K	Or.-Or.-Yl. Output Grid
64	330KΩ	½	63-1890	BTS-330K	Or.-Or.-Yl. " "
65	330Ω	2	63-1622	BW-2-330	Or.-Or.-Br. Output Cathode
66	470KΩ	½	63-1897	BTS-470K	Yl.-Vi.-Yl. Feedback
67	1800Ω	2	63-1620	BT-2-1800	Br.-Gray-Red Filter
68	82Ω	½	63-1740	BW-½-82	Gray-Red-Blk. Hash Suppressor
69	82Ω	½	63-1740	BW-½-82	Gray-Red-Blk. " "

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA		INSTALLATION NOTES
				ZENITH PART No.	RADIART PART No.	
70	Interrupter	6.3 VDC	115 ∿	190-22A	5300	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA				
	PRI.	SEC. 1	SEC. 2	SEC. 3	ZENITH PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
71	6.3V DC @ 4.4A	590V AC 100mA DC			95-1071		T22R20#		

#Drill new mounting holes.

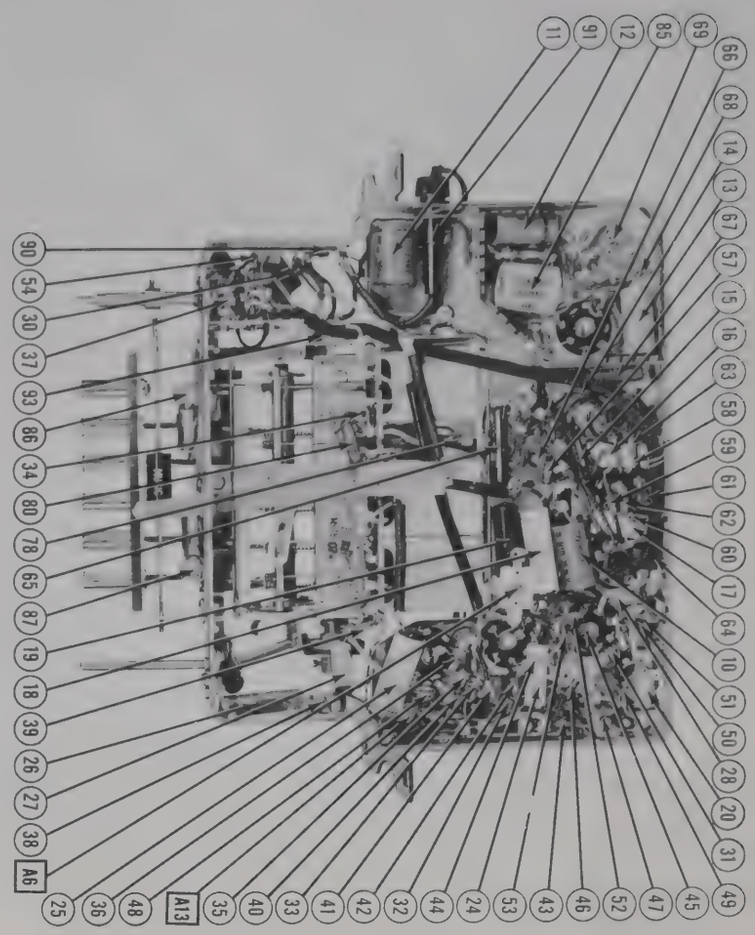
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		ZENITH PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
72	9000Ω CT	3.6Ω	370Ω CT	.6Ω	95-1070	A-3823	T22S47#	A-2936	#Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			ZENITH PART No.	JENSEN PART No.	QUAM PART No.	
73	FIELD	VC IMP.	49-627		69A3	
	PM	3.6Ω				
74	CONE DIA. 6"	VC DIA. 9/16"				

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	ZENITH PART No.	MEISSNER PART No.	
75	Ant. Coil		13Ω	S-14227*		*Items 76, 77, 78 & 79 are ganged together and slug tuned. They are part of complete tuning assembly which may be obtained under Part #S14295.
76	Presel.Coil		13Ω	S-14227*		
77	RF Coil		13Ω	S-14227*		
78	Osc. Coil		3.6Ω	S-14228*		
79	Osc. Shunt	7.8Ω	4.8Ω	S-14225		
80	Osc. Series		1Ω	S-14226		
81	Input IF	39.8Ω	40Ω	55-1077		
82	Output IF	65Ω		95-1078		
83	Ant. Choke		1Ω	S-8819		
84	Noise Choke		0Ω	S-11232		
85	Hash Choke		0Ω	20-213		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					ZENITH PART No.		
86	Bayonet	6-8	0.4	White			Type #55
87	"	6-8	0.4	"			" "

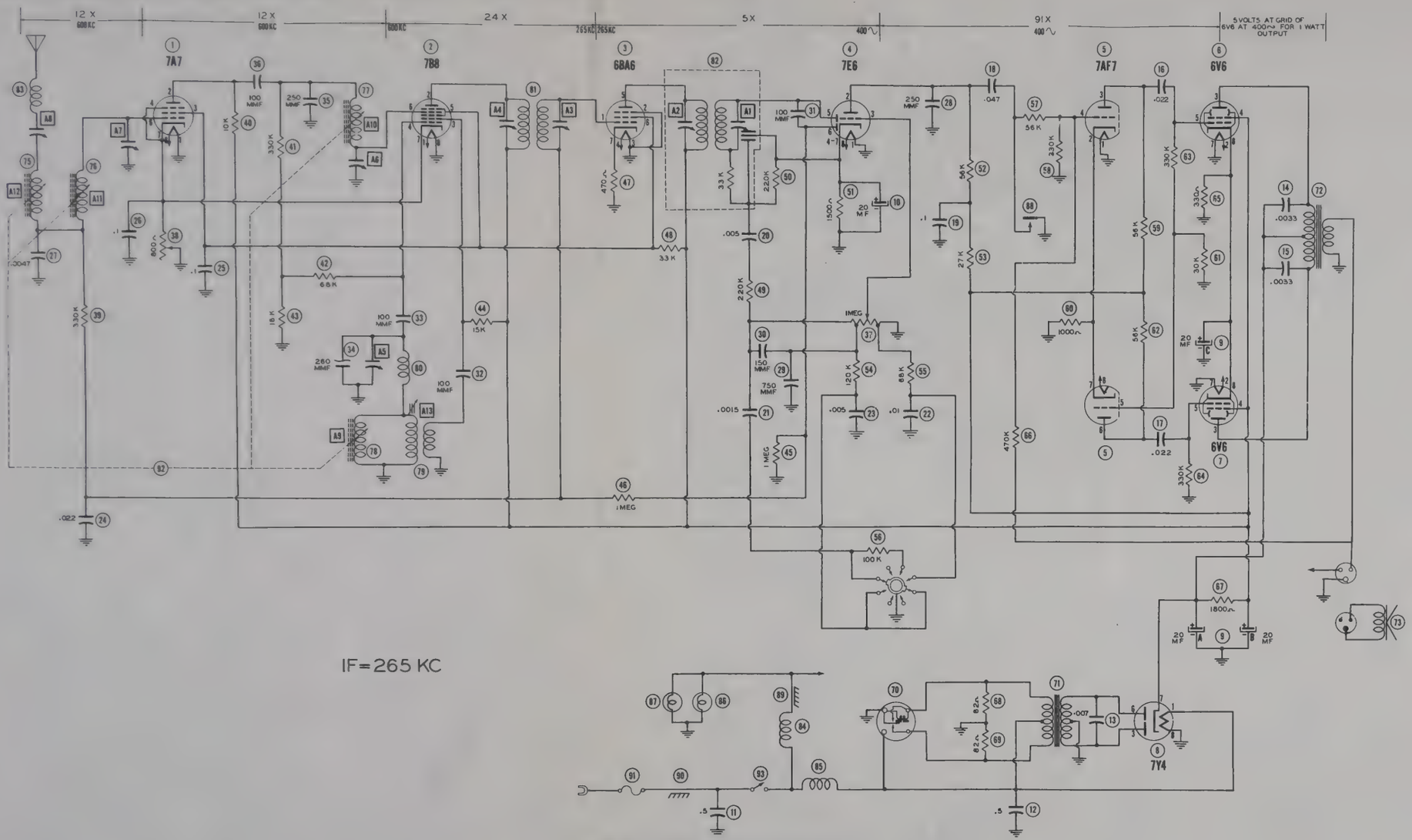
PUSHBUTTON ADJUSTMENTS

1. Turn set on and allow to warm up for at least fifteen minutes.
2. Make up a list of stations desired to be set up.
3. Tune in the first station selected with the manual tuning control.
4. Loosen any button for this station, by turning counter-clockwise a few turns.
5. Push button completely in and release.
6. Tighten the button firmly.
7. To check accuracy of setting, detune with manual control and retune with pushbutton. If setting is off repeat Steps 3, 4, 5 and 6.
8. To set up the remaining buttons follow the procedure outlined above.

MISCELLANEOUS

ITEM No.	PART NAME	ZENITH PART No.	NOTES
88	Switch	S-14034	Muting
89	Spark Plate		
90	" "		
91	Fuse	130-11	14 Amp.
92	Tuning Assby.	S-14386	
A5	Trimmer Strip	22-1722	Osc. Adj.
A7			Ant. Adj.
A6	Trimmer	22-1715	RF Adj.
A8	"	22-1721	Ant. Adj.
	Dial Scale	26-395	
	Dial Pointer	56-20c	

DATE 10/30-4-4917-9 SST #7-4-FOLDER #9



†READINGS TAKEN WITH SENSITIVITY CONTROL SET AT MAXIMUM RESISTANCE.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0V.	200VAC	95VDC	6.6VDC†	0V.	0V.	6.6VDC†	-6.3VDC
2	7B8	-6.3VDC	220VDC	160VDC	-6.5VDC§	95VDC	1VDC	6.6VDC†	0V.
3	6BA6	0V.	0V.	0V.	-6.3VDC	220VDC	95VDC	2.7VAC	-
4	7E6	0V.	98VDC	0V.	2.5VDC	.1VDC	0V.	2.5VDC	-6.3VDC
5	7AF7	-6.3VDC	4.3VDC	96VDC	0V.	0V.	98VDC	4.3VDC	0V.
6	6V6GT	0V.	-6.3VAC	255VDC	215VDC	0V.	0V.	0V.	13VDC
7	6V6GT	0V.	-6.3VAC	255VDC	215VDC	0V.	0V.	0V.	13VDC
8	7Y4	-6.3VDC	0V.	285VAC	285VAC	0V.	285VAC	260VDC	0V.

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	7A7	0Ω	4 Meg.	4 Meg.	800†	0Ω	2.3 Meg.	800Ω†	.1Ω
2	7B8	.1Ω	4 Meg.	4 Meg.	86KΩ	4 Meg.	350KΩ	800Ω†	0Ω
3	6BA6	2 Meg.	0Ω	0Ω	.1Ω	4 Meg.	4 Meg.	470Ω	-
4	7E6	0Ω	4 Meg.	800KΩ	1.5KΩ	250KΩ	1 Meg.	1.5KΩ	.1Ω
5	7AF7	.1Ω	1KΩ	4 Meg.	150KΩ	30KΩ	4 Meg.	1KΩ	0Ω
6	6V6GT	0Ω	.1Ω	4 Meg.	4 Meg.	36KΩ	INF.	0Ω	330Ω
7	6V6GT	0Ω	.1Ω	4 Meg.	4 Meg.	330KΩ	INF.	0Ω	330Ω
8	7Y4	.1Ω	INF.	230Ω	230Ω	INF.	210Ω	4 Meg.	0Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

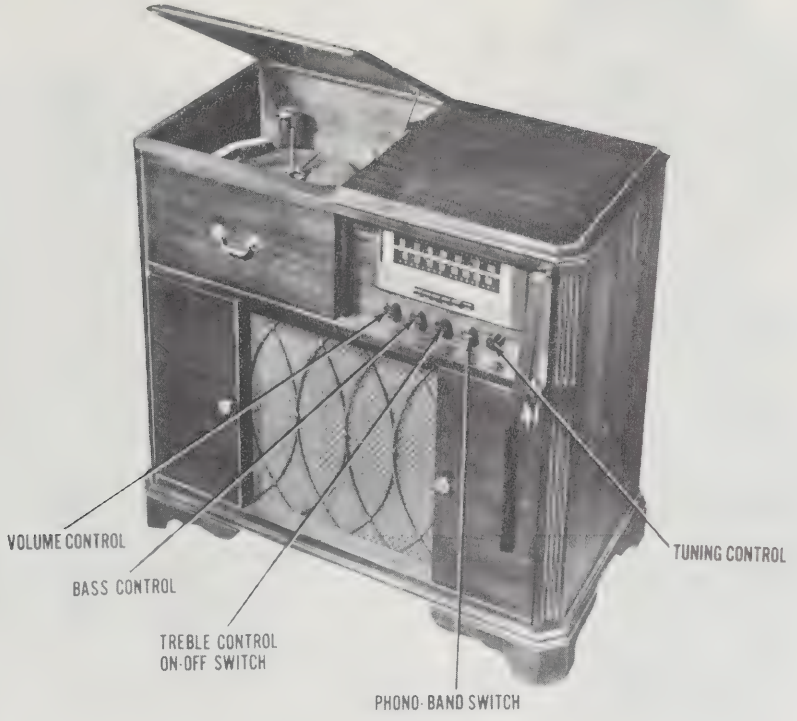
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.3 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

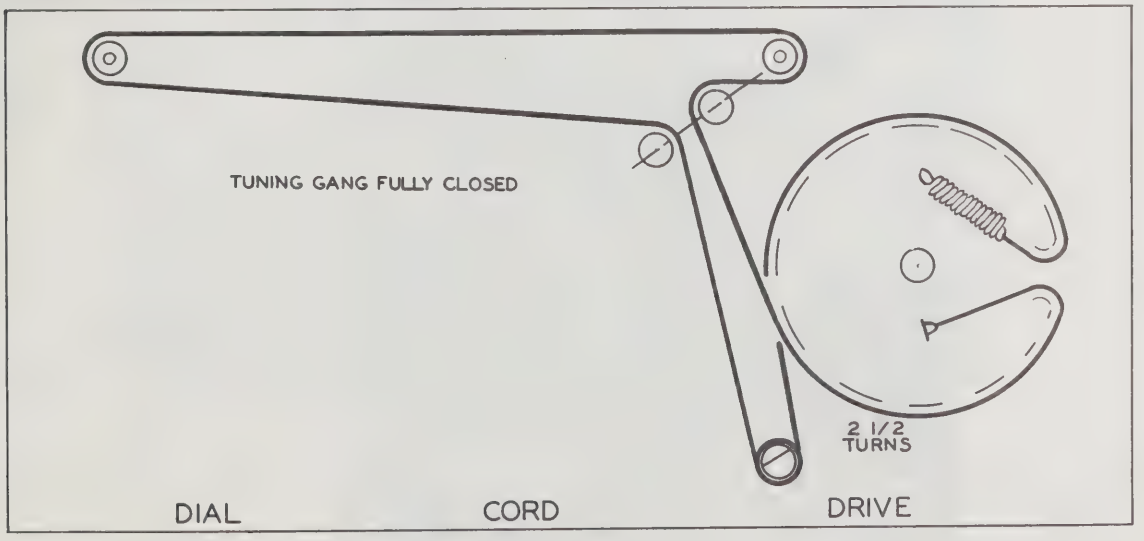
©Howard W. Sams & Co., Inc. 1948

HOFFMAN MODELS C504, C514 (Ch. 123)



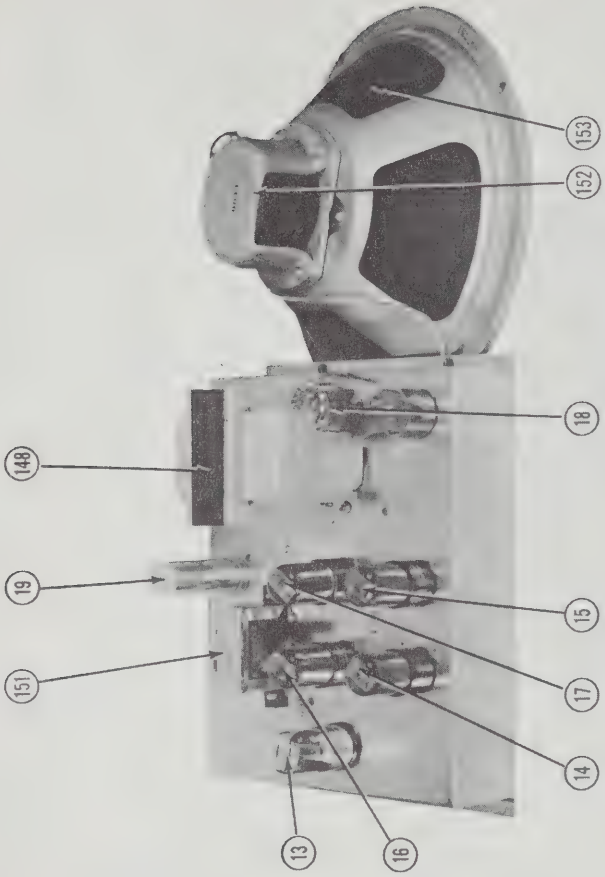
HOFFMAN MODEL C514

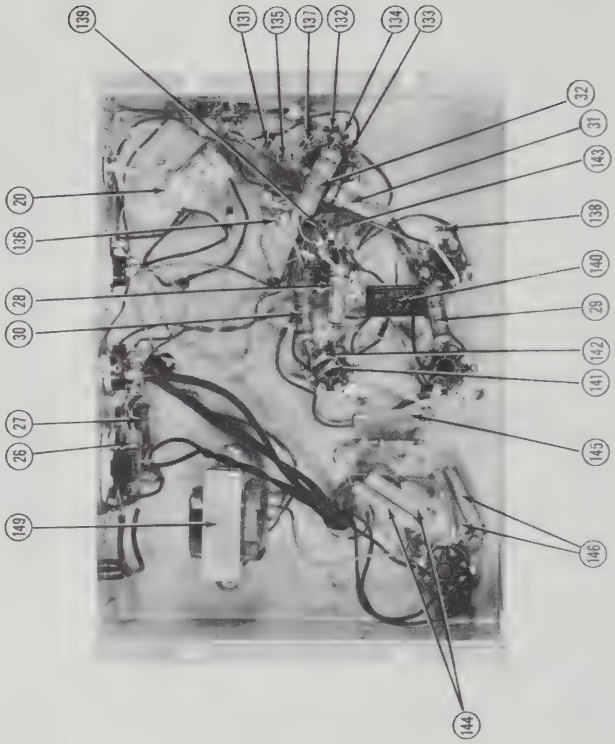
TRADE NAME	Hoffman, Models C504, C514 (Ch. 123)		
MANUFACTURER	Hoffman Radio Corp., 3761 S. Hill St., Los Angeles, Calif.		
TYPE SET	AC Operated Combination Phono-Recorder-Radio, AM-FM Superheterodyne Receiver		
TUBES	(EIGHTEEN) Types, 6BA6 RF Amp., 6BE6 Mixer, 6C4 Oscillator, 6BA6 1st IF Amp., 6BA6 2nd IF Amp., 6AL5 FM Ratio Det., 6AT6 AM Det.-AVC, 6SJ7 AF Amp., 6J5GT Tone Amp., 6SJ7 Mic. Amp., 6SQ7 T. E. Rect.-AF Amp., 6U5/6G5 Recorder Ind., 6J5GT Phase Inv., (4) 6K6GT Power Output, 5U4G Rectifier.		
POWER SUPPLY	110-120 Volts AC	RATING	1.4 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	535 - 1650 KC	FREQ. MOD.	88-108MC

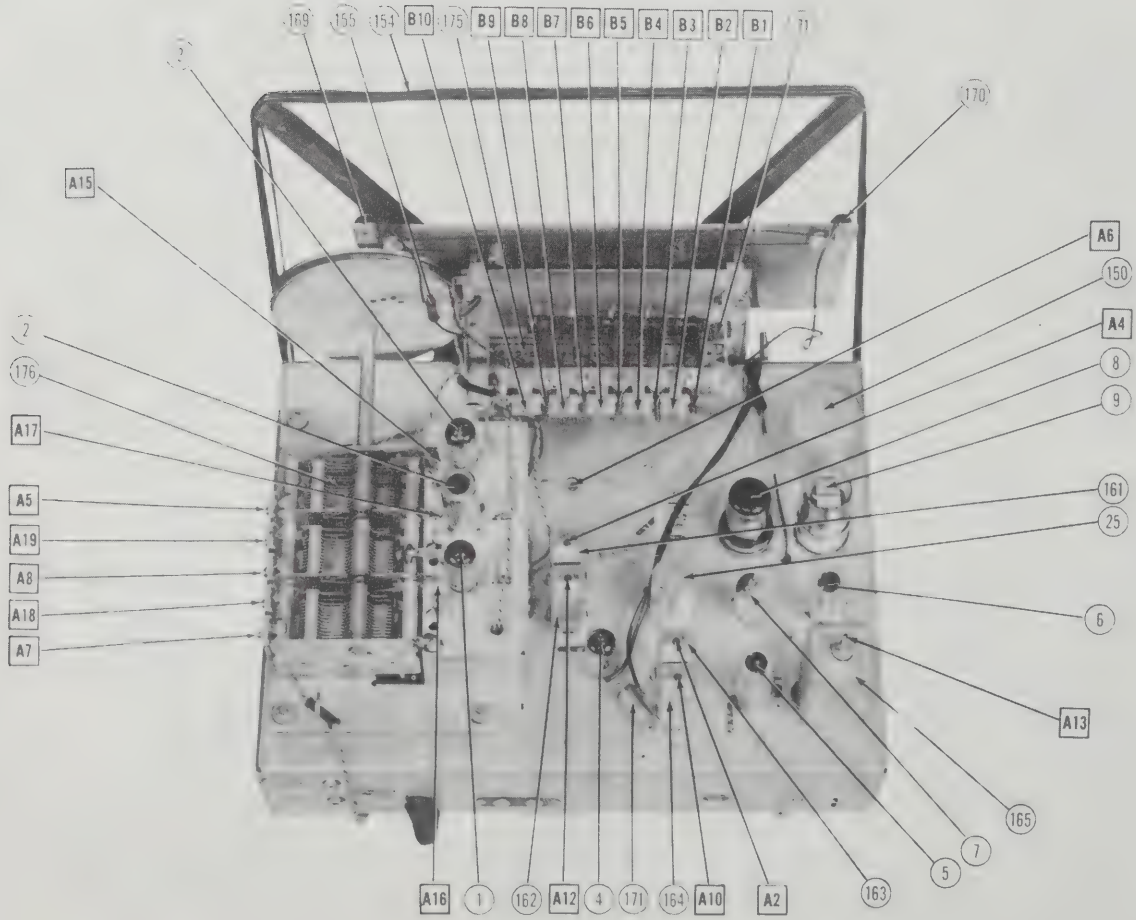


HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America


153
152
18
148
19
15
151
17
14
13
16


139
131
135
137
132
134
133
32
31
143
20
138
136
140
28
29
30
142
141
27
145
26
149
146
144


169
155
154
B10
175
B9
B8
B7
B6
B5
B4
B3
B2
B1
171
3
170
A15
A6
150
A4
2
176
8
9
A17
161
A5
25
A19
6
A8
A18
A13
A7
165
7
5
163
A16
1
162
A12
4
171
164
A10
A2

61
102
108
59
60
103
B
104
105
24
44
A
107
113
106
38
114
40
147
115
112
41
111
43
109
76
23
54
51
42
78
39
48
A3
77
88
96
168
97
98
58
116
173
55
57
117
118
119
56
69
67
68
90
89
159
70
160
86
66
73
87
158
64
84
72
157
74
50
49
82
80
52
156
75
167
83
65
81
85
166
A11
47
53
46
92
101
93
100
A9
94
A1
63
99
95
91
62
45
110
A14

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: HOFFMAN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Mixer	6BE6	6BE6	7CH	
3	Oscillator	6C4	6C4	6BG	
4	1st IF Amp.	6BA6	6BA6	7BK	
5	2nd IF Amp.	6BA6	6BA6	7BK	
6	FM Ratio Det.	6AL5	6AL5	6BT	
7	AM Det.-AVC	6AT6	6AT6	7BT	
8	AF Amp.	6SJ7	6SJ7	8N	
9	Tone Amp.	6J5GT	6J5GT	6Q	
10	Mic. Amp.	6SJ7	6SJ7	8N	
11	T.E. Rect.-AF Amp.	6SQ7	6SQ7	8Q	
12	Recorder Ind.	6U5/6G5	6U5/6G5	6R	
13	Phase Inv.	6J5GT	6J5GT	6Q	
14	Power Output	6K6GT	6K6GT	7S	
15	" "	6K6GT	6K6GT	7S	
16	" "	6K6GT	6K6GT	7S	
17	" "	6K6GT	6K6GT	7S	
18	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
19A	20	450	4200	AF44J4A	UP2245C	DY-312	EL-350	■ Filter
B	20	450						▲ "
C	20	25						Cathode Bypass
20	10	450	4203	PRS450/10	BR1045	M-10-450	UT-12	Decoupling
21	10	450	4203	PRS450/10	BR1045	M-10-450	UT-12	Decoupling
22	25	25	4205	PRS25/25	BR252A	M-25-25	TA-25	Cathode Bypass
23	25	25	4205	PRS25/25	BR252A	M-25-25	TA-25	" "
24	5	50	4209	PRS150/4	BR550	M-8-150	TA-55	Stabilizing Cap.
25	20	450	4207	AF4J	UP2045	DY-20-450	EL-2	Decoupling
26	.01	600	4105	684-01	DT6S1	ST-6-01	TC-11	Line Filter
27	.01	600	4105	684-01	DT6S1	ST-6-01	TC-11	" "
28	.005	600	4102	684-005	DT6D5	ST-6-005	TC-25	Recording Level Ind. Coup.
29	.001	600	4104	684-001	DT6D1	ST-6-001	TC-21	Output Plate Bypass
30	.001	600	4104	684-001	DT6D1	ST-6-001	TC-21	" " "
31	.05	400	4101	484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
32	.05	400	4101	484-05	DT4S5	ST-4-05	TC-15	" "
33	.02	400	4106	484-02	DT4S2	ST-4-02	TC-12	" "
34	.005	600	4102	684-005	DT6D5	ST-6-005	TC-25	" "
35	.01	600	4112	684-01	DT6S1	ST-6-01	TC-11	" "
36	.05	400	4101	484-05	DT4S5	ST-4-05	TC-15	Mic. Amp. Screen Byp.
37	.01	600	4112	684-01	DT6S1	ST-6-01	TC-11	Recording Ind. Grid Byp.
38	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
39	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	Tone Comp.
40	.005	600	4102	684-005	DT6D5	ST-6-005	TC-25	" "
41	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
42	.05	400	4101	484-05	DT4S5	ST-4-05	TC-15	AF Screen Bypass
43	.02	400	4106	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
44	.002	600	4118	684-002	DT6D2	ST-6-002	TC-22	De-emphasis
45	.001	600	4104	684-001	DT6D1	ST-6-001	TC-21	2nd IF Screen Bypass
46	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	1st IF Decoupling
47	.001	600	4104	684-001	DT6D1	ST-6-001	TC-21	1st IF Screen Bypass
48	.05	200	4100	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
49	.05	200	4100	484-05	DT2S5	ST-4-05	TC-15	" "
50	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	RF Bypass
51	.01	400	4112	484-01	DT4S1	ST-4-01	TC-11	RF Bypass Pwr. Supply
52	.05	200	4100	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
53	.05	200	4100	484-05	DT2S5	ST-4-05	TC-15	Filament Bypass
54	.5	200	4110	484-.5	DT2P5	ST-2-5	TC-5	Tone Compensation
55	650	300	4011		1W5T6	MO.5-36	MS-36	" "
56	330	300	4010	1468-0003	5W5T3	MO.5-33	1FM-33	" "
57	330	300	4010	1468-0003	5W5T3	MO.5-33	1FM-33	" "
58	100	300	4012	1468-0001	5W5T1	MO.5-31	1FM-31	" "
59	330	300	4010	1469-0003	5R5T3	MOS.5-33	MS-33	Diode Load Cap.-Note

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: HOFFMAN PART No.	IRC PART No.	IDENTIFICATION CODES
106	6800Ω	½	4557	BTS-6800	Blue-Gray-Red Ratio Det. Diode Load
107	6800Ω	½	4557	BTS-6800	Blue-Gray-Red " " " "
108	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. AVC Network
109	2200Ω	½	4512	BTS-2200	Red-Red-Red 1st AF Cathode
110	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. 1st AF Screen
111	220KΩ	½	4500	BTS-220K	Red-Red-Yl. 1st AF Plate
112	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Tone Amp. Grid
113	2200Ω	½	4512	BTS-2200	Red-Red-Red Tone Amp. Cathode
114	22KΩ	½	4501	BTS-22K	Red-Red-Or. Tone Amp. Cathode
115	22KΩ	½	4501	BTS-22K	Red-Red-Or. Tone Amp. Plate Load
116	4.7 Meg.	½	4544	BTS-4.7 Meg.	Yl.-Vi.-Grn. Phono Tone Comp.
117	47KΩ	½	4559	BTS-47K	Yl.-Vi.-Or. " " "
118	47KΩ	½	4559	BTS-47K	Yl.-Vi.-Or. " " "
119	22KΩ	½	4538	BTS-22K	Red-Red-Or. " " "
120	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Mic. Pre-Amp. Grid
121	4700Ω	½		BTS-4700	Yl.-Vi.-Red Mic. Pre-Amp. Cathode
122	2.2 Meg.	½	4502	BTS-2.2 Meg.	Red-Red-Grn. Mic. Pre-Amp. Screen
123	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. Mic. Pre-Amp. Plate Load
124	10 Meg.	½	4505	BTS-10 Meg.	Br.-Blk.-Blue Mic. AF Grid
125	220KΩ	½	4500	BTS-220K	Red-Red-Yl. Mic. AF Plate Load
126	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Recording Ind. Grid
127	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. Recording Ind. Plate Load
128	47KΩ	1	4516	BTA-47K	Yl.-Vi.-Or. Decoupling
129	1Ω	½	4707	BW-½-1	Br.-Blk.-Gold Voltage Dropping
130	.51Ω	½	4708	BW-½-.47	Grn.-Br.-Silver Recorder Head Loading
131	220KΩ	½	4500	BTS-220K	Red-Red-Yl. Isolation
132	1 Meg.	½	4513	BTS-1 Meg.	Br-Blk.-Grn. Phase Inv. Grid
133	2200Ω	½	4512	BTS-2200	Red-Red-Red Phase Inv. Cathode
134	47KΩ	½	4559	BTS-47K	Yl.-Vi.-Or. Phase Inv. Cathode
135	47KΩ	½	4559	BTS-47K	Yl.-Vi.-Or. Phase Inv. Plate Load
136	10KΩ	½	4515	BTS-10K	Br.-Blk.-Or. Phase Inv. Plate Decoup.
137	220KΩ	½	4500	BTS-220K	Red-Red-Yl. Isolation
138	220KΩ	½	4500	BTS-220K	Red-Red-Yl. Output Grid
139	220KΩ	½	4500	BTS-220K	Red-Red-Yl. " "
140	220Ω	3	4706	AB-250	Red-Red-Br. Output Cathode
141	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. Recording Ind. Net.
142	470KΩ	½	4506	BTS-470K	Yl.-Vi.-Yl. " " "
143	1 Meg.	½	4513	BTS-1 Meg.	Br.-Blk.-Grn. " " "
144	10KΩ	2	4503	BT-2-10K	Br.-Blk.-Or. Bleeder-See Note 1
145	10KΩ	2	4503	BT-2-10K	Br.-Blk.-Or. " " " 1
146	10KΩ	2	4503	BT-2-10K	Br.-Blk.-Or. " " " 1
147	22KΩ	½	4501	BTS-22K	Red-Red-Or. Tone Amp. Cathode

Note 1-Some models use two 22KΩ 2 W. resistors in parallel in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: HOFFMAN PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
148	117V AC @ 1.4A	820V CT .172A DC	4.9V AC @ 3.0A	6.4VAC @ 5.6A	5007		T22R35‡	P-3156‡

‡Drill new mounting holes.

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000∿)	REPLACEMENT DATA: HOFFMAN PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
149	168MA.	96Ω	5.5 Henries	5116				

(BASS BOOST) CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D.C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000∿)	REPLACEMENT DATA: HOFFMAN PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
150		12Ω	3.7 Henries	5103				

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	HOFFMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
60	330	300	4010	1468-0003	5R5T3	MO8.5-33	MS-33	Diode Load Cap.-Note
61	330	300	4010	1468-0003	5W5T3	MO.5-33	1FM-33	RF Bypass
62	2300	300	4006	1467-0025	1W5D25	MW.5-225	1FM-23	2nd IF Decoupling
63	100	300	4012	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
64	5000	300	4029	1467-005	1D5D5	MW.5-25	1FM-25	Mixer Decoupling
65	470	500	4003	1468-0005	5W5T5	MO.5-35	1FM-35	Mixer Screen Bypass
66	220	300	4026	1468-0002	5W5T2	MO.5-32	1FM-32	Mixer Cathode Bypass
67	22	300	4021	1468-000025	5W5Q25	MO.5-425	MS-425	Osc. Grid Cap.
68	100	300	4012	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Coupling
69	50	300	4031	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Feedback
70	50	300	4023	1469-00005	5R5Q5	MO8.5-45	MS-45	Fixed Trimmer
71	500	500	4004	1469-0005	5R5T5	MO8.5-35	MS-35	" "
72	100	300	4012	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling
73	100	300	4012	1468-0001	5W5T1	MO.5-31	1FM-31	RF Plate Decoupling
74	470	300	4003	1468-0005	5W5T5	MO.5-35	1FM-35	RF Screen Bypass
75	100	300	4012	1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling

Note-When either Item 59 or 60 are replaced, replace both with capacitors of equal value.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	HOFFMAN PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
76A	500KΩ	½	4804	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 76A per instructions
77A	50KΩ	½	4806	D11-123	M-44-S	Bass Control
B	Shaft		Not Req.	A	Not Req.	Attach to 77A per instructions
78A	250KΩ	½	4805	D13-130	M-64-Z	Treble Control
B	Shaft		Not Req.	A	Not Req.	Attach to 78A per instructions
C	Switch		" "	41	SW-A	" " " " "
79A	500KΩ	½	4802	D13-133	M-60-Z	Mike Control
B	Shaft		Not Req.	A	Not Req.	Attach to 79A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	HOFFMAN PART No.	IRC PART No.	IDENTIFICATION CODES
80	270KΩ	½	4545	BTS-270K	Red-Vi.-Yl. RF Grid
81	100KΩ	½	4511	BTS-100K	Br.-Blk.-Yl. AVC Network
82	56Ω	½	4561		Grn.-Blue-Blk. RF Cathode
83	33KΩ	1	4556	BTA-33K	Or.-Or.-Or. RF Screen
84	1500Ω	½	4534	BTS-1500	Br.-Grn.-Red RF Decoup.
85	100KΩ	½	4511	BTS-100K	Br.-Blk.-Yl. AVC Network
86	56Ω	½	4561		Grn.-Blue-Blk. Mixer Cathode
87	33KΩ	1	4556	BTA-33K	Or.-Or.-Or. Mixer Screen
88	1500Ω	½	4534	BTS-1500	Br.-Grn.-Red Mixer Decoupling
89	22Ω	½	4560		Red-Red-Blk. Parasitic Suppressor
90	22KΩ	½	4501	BTS-22K	Red-Red-Or. Osc. Grid
91	4700Ω	2	4551	BT-2-4700	Yl.-Vi.-Red Decoupling
92	56Ω	½	4561		Grn.-Blue-Blk. 1st IF Cathode
93	33KΩ	1	4556	BTA-33K	Or.-Or.-Or. 1st IF Screen
94	1500Ω	½	4534	BTS-1500	Br.-Grn.-Red 1st IF Decoupling
95	100KΩ	½	4511	BTS-100K	Br.-Blk.-Yl. Diode Filter
96	2.2 Meg.	½	4502	BTs-2.2 Meg.	Red-Red-Grn. AVC Network
97	100KΩ	½	4511	BTS-100K	Br.-Blk.-Yl. Diode Load
98	47KΩ	½	4559	BTS-47K	Yl.-Vi.-Or. " "
99	56Ω	½	4561		Grn.-Blue-Blk. 2nd IF Cathode
100	33KΩ	1	4556	BTA-33K	Or.-Or.-Or. 2nd IF Screen
101	1500Ω	½	4534	BTS-1500	Br.-Grn.-Red 2nd IF Decoup.
102	120Ω	½	4546		Br.-Red-Br. RF Filter
103	47KΩ	½	4566	BTS-47K	Yl.-Vi.-Or. De-emphasis
104	390Ω	½	4548		Or.-White-Br. Balancing
105	390Ω	½	4549		Or.-White-Br. "

DATE 10/48-#4617-10 SET #47-FOLDER #10

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA STANCOR PART No.	REPLACEMENT DATA THORDAR'N PART No.	REPLACEMENT DATA MERIT PART No.	INSTALLATION NOTES
151	7000Ω CT	2.7Ω	530Ω CT	.4Ω	5108	A-3852#	T22S58	A-2904#	#Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD RES. 490Ω VC IMP. 2.7Ω				
152		9044		12E6	
	CONE DIA. 11-3/8" VC DIA. 1-1/4"				
153					

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA MEISSNER PART No.	INSTALLATION NOTES
154	Loop Ant.	.2Ω	.2Ω	55210		
155	Loop Load. Coil		4.4Ω	5265		
156	FM Ant.Coil		0Ω	5253		
157	BC RF Coil	1Ω	7.9Ω	5264		
158	FM " "		0Ω	5252		
159	BC Osc. "		5.7Ω	5263		
160	FM " "		0Ω	5251		
161	AM Input IF	12Ω	12Ω	5276	16-6678	
162	FM 1st IF	.1Ω	.4Ω	5274		
163	AM OutputIF	12Ω	12Ω	5277	16-6678	
164	FM 2nd IF	1.2Ω	.4Ω	5275		
165	FM Det. Trans.	1.9Ω	.1Ω	5278		
166	Fil. Chk.		.1Ω	5260		
167	Plate Chk.		2.3Ω	5254		
168	" "		2.3Ω	5254		

DIAL LIGHT

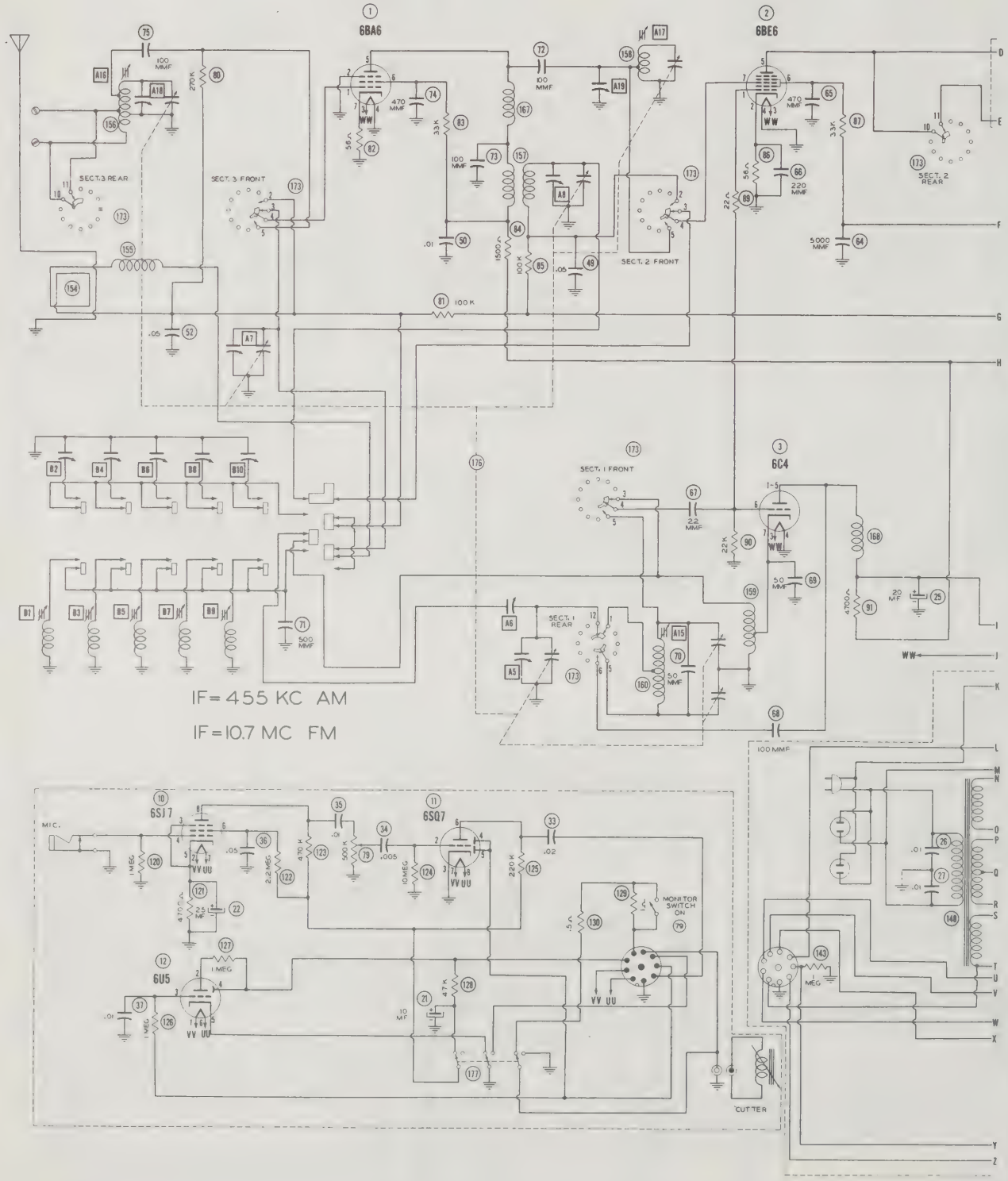
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA	INSTALLATION NOTES
169-171	Bayonet	6-8	0.25	Blue			Type 44

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA HOFFMAN PART No.	REPLACEMENT DATA ASTATIC PART No.	REMARKS
172		QT3-M	QT3-M Original Part

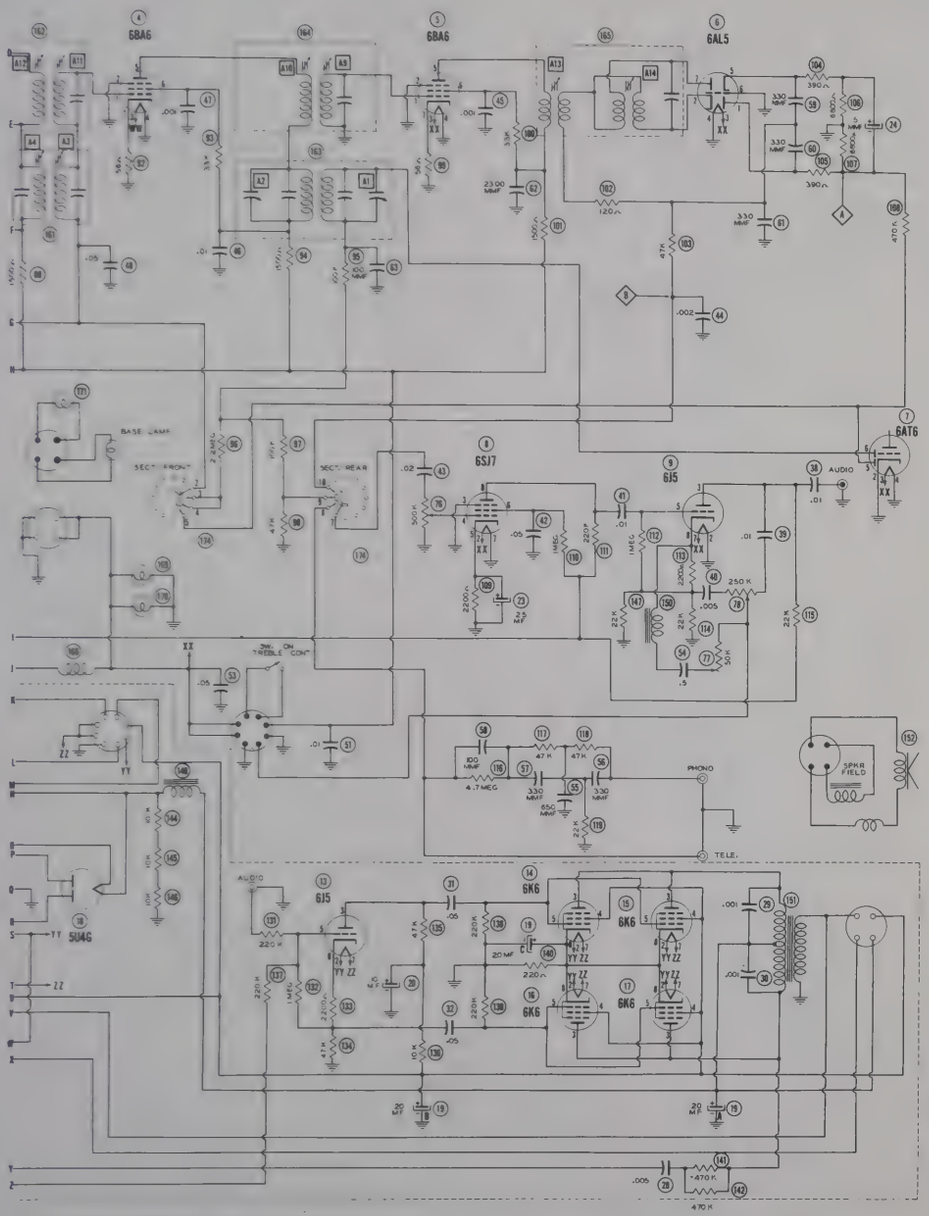
MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
173A	Switch	6014	Band-Phono (RF)
B	"	6015	" " (Audio)
174	"	6003	Radio-Record
175	Tuning Assby.	55200	Pushbutton
176	Tuning Gang	4408	(20-480MMF, 20-430MMF, 20-345MMF)
177	Switch	6003	Recorder, On-Off
A5	Trimmer Strip	4313	BC Osc. Adj.
A7			BC Ant. Adj.
A8			BC RF Adj.
A6	Padder	4301	BC Osc. Adj.
A18	Trimmer Strip	4315	FM Ant. Adj.
A19			FM RF Adj.



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W Sams & Co., Inc 1948



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

4817-10

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6EA6	-.2VDC	0V.	6.4VAC	0V.	250VDC	105VDC	.8VDC	-
2	6BE6	-13VDC§	.4VDC	6.4VAC	0V.	260VDC	50VDC	-.2VDC	-
3	6C4	200VDC	0V.	6.4VAC	0V.	200VDC	-13VDC§	0V.	-
4	6BA6	-.8VDC	0V.	6.4VAC	0V.	240VDC	120VDC	.8VDC	-
5	6BA6	0V.	0V.	6.4VAC	0V.	240VDC	95VDC	.8VDC	-
‡ 6	6AL5	.2VDC	-.4VDC	6.4VAC	0V.	.2VDC	0V.	-2VDC	-
7	6AT6	0V.	0V.	6.4VAC	0V.	-.4VDC	-.2VDC	0V.	-
8	6SJ7	0V.	6.4VAC	0V.	0V.	1VDC	27VDC	0V.	42VDC
9	6J5GT	0V.	0V.	160VDC	200VDC	5VDC	25VDC	6.4VAC	30VDC
10	6SJ7	0V.	0V.	.8VDC	0V.	.8VDC	30VDC	6.4VAC	-
11	6SQ7	0V.	-.4VDC	0V.	-1VDC	-1VDC	110VDC	0V.	6.4VAC
12	6U5/6G5	-	-	-	-	-	-	-	-
13	6J5GT	0V.	0V.	190VDC	30VDC	30VDC	80VDC	6.4VAC	85VDC
14	6K6GT	0V.	0V.	300VDC	270VDC	0V.	0V.	6.4VAC	23VDC
15	6K6GT	0V.	0V.	300VDC	270VDC	0V.	0V.	6.4VAC	23VDC
16	6K6GT	0V.	0V.	300VDC	270VDC	0V.	-.8VDC	6.4VAC	23VDC
17	6K6GT	0V.	0V.	300VDC	270VDC	0V.	300VDC	6.4VAC	23VDC
18	5U4G	0V.	330VDC	0V.	410VAC	0V.	410VAC	0V.	330VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

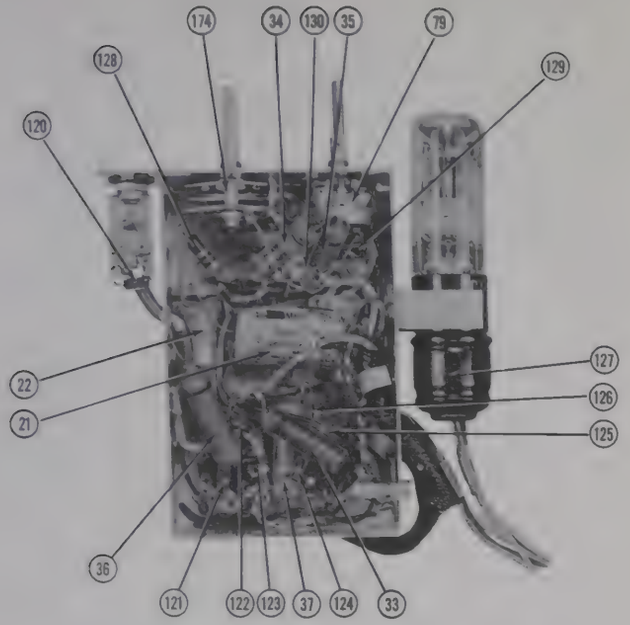
RESISTANCE READINGS

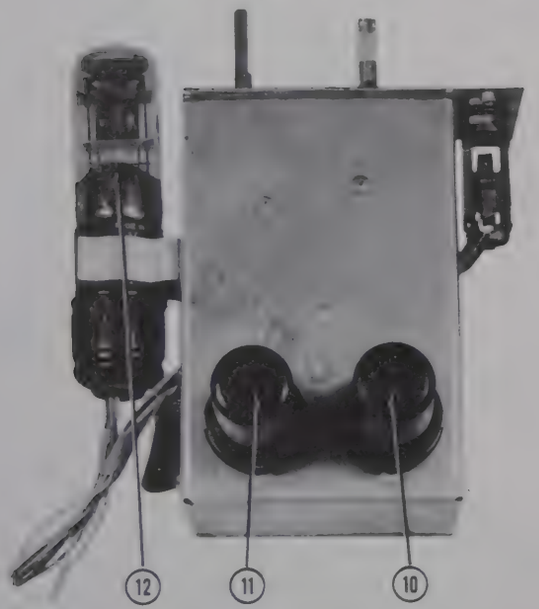
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	2.4 Meg.	0Ω	.1Ω	0Ω	31KΩ	64KΩ	56Ω	-
2	6BE6	22KΩ	56Ω	.1Ω	0Ω	31KΩ	64KΩ	2.4 Meg.	-
3	6C4	35KΩ	INF.	.1Ω	0Ω	35KΩ	22KΩ	1Ω	-
4	6BA6	2.3 Meg.	0Ω	.1Ω	0Ω	32KΩ	65KΩ	56Ω	-
5	6BA6	.4Ω	0Ω	.1Ω	0Ω	32KΩ	65KΩ	56Ω	-
‡ 6	6AL5	7KΩ	7KΩ	.1Ω	0Ω	INF.	0Ω	INF.	-
7	6AT6	INF.	0Ω	.1Ω	0Ω	470KΩ	250KΩ	INF.	-
8	6SJ7	0Ω	.1Ω	0Ω	500KΩ	2.2KΩ	1 Meg.	0Ω	220KΩ
9	6J5GT	0Ω	0Ω	52KΩ	35KΩ	1 Meg.	11KΩ	.1Ω	14KΩ
10	6SJ7	0Ω	0Ω	4.7KΩ	1 Meg.	4.7KΩ	2.2 Meg.	.1Ω	550KΩ
11	6SQ7	0Ω	10 Meg.	0Ω	1 Meg.	1 Meg.	300KΩ	0Ω	.1Ω
12	6U5/6G5	-	-	-	-	-	-	-	-
13	6J5GT	0Ω	0Ω	90KΩ	1.5 Meg.	1 Meg.	5KΩ	.1Ω	47KΩ
14	6K6GT	0Ω	0Ω	30KΩ	30KΩ	220KΩ	INF.	.1Ω	220Ω
15	6K6GT	0Ω	0Ω	30KΩ	30KΩ	220KΩ	INF.	.1Ω	220Ω
16	6K6GT	0Ω	0Ω	30KΩ	30KΩ	220KΩ	1.3 Meg.	.1Ω	220Ω
17	6K6GT	0Ω	0Ω	30KΩ	30KΩ	220KΩ	280KΩ	.1Ω	220Ω
18	5U4G	INF.	30KΩ	INF.	120Ω	INF.	130Ω	INF.	30KΩ

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.





STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	20X	600KC
RF GRID TO CONVERTER GRID	10X	600KC
CONVERSION GAIN	7X	IN 600KC OUT 455KC
INPUT IF TRANS.	.8X	455KC
IF TUBE	150X	455KC
OUTPUT IF TRANS.	1X	455KC
1st AUDIO	100X	400 ∿
TONE AMP.	2.5X	400 ∿
PHASE INVERTER	1X	400 ∿
OUTPUT	18X	400 ∿
MIC. PREAMP.	95X	400 ∿
MIC. AF	40X	400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

AM alignment must be done before FM alignment.
To set pointer turn tuning cap. fully closed and set pointer 1-13/16" from left edge of dial backplate. This is the calibration mark referred to in Steps below.
Use insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to center AM stator of tuning cap. Low side to chassis.	455KC	"AM" (center position)	Tuning cap. fully open.	Across voice coil.	A1,A2, A3,A4.	Adjust for maximum output.
2	.1MFD cap. and 400Ω carbon res. in series.	High side to external antenna clip. Low side to chassis.	1650KC	"	"	"	A5	" " " "
3	"	"	535KC	"	Tuning cap. fully closed	"	A6	Adjust for maximum output. Repeat Steps 2 & 3 until no further improvement can be made.
4	"	"	1400KC	"	Tune for maximum output.	"	A7,A8	Adjust for maximum output.

The following adjustments should be made only upon completion of AM alignment.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect 5000Ω carbon resistors across secondaries of FM 1st IF Transformer (61) and FM 2nd IF Transformer (63).

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	Direct	High side to center FM stator of tuning cap. Low side to chassis.	10.7MC (Unmodulated)	FM (fully clockwise)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis.	A9,A10 A11,A12 A13	(See prealignment instructions). Adjust for maximum deflection.
6	Direct	"	"	"	"	DC probe to Point (B). Common to chassis.	A14 A14	Adjust for zero deflection. Remove two 5000Ω resistors. Continue with FM-RF Alignment in Step 8.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5	.01 MFD.	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	10.7MC (Freq. Mod.)	FM (fully clockwise)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A13,A9, A10	Disconnect 5 MFD. cap. from Point (A). Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD.	High side to center FM stator of tuning cap. Low side to chassis.	"	"	"	"	A11, A12	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Reconnect 5 MFD. cap. to Point (A).
7	.01 MFD.	High side to Pin 1 (grid) of 6BA6 1st IF Tube (4). Low side to chassis.	"	"	"	Vertical input to Point (B). Ground to chassis.	A14	Adjust for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Continue with FM-RF Alignment in Step 8.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8	2-150Ω carbon res.	Each side in series with 150Ω resistor to FM ant. terminals.	100MC (Unmodulated)	FM	3-3/8" from calibration mark.	DC probe to Point (A). Common to chassis	A15	Adjust for maximum deflection.
9	"	"	90MC	"	Tune for maximum deflection.	"	A16, A17	" " " "
10	"	"	106MC	"	"	"	A18, A19	Adjust for maximum deflection. Repeat Steps 8, 9 and 10 until no further improvement can be made.

PUSHBUTTON ADJUSTMENTS

The frequency ranges for the buttons in order from left to right are:
550-890KC, 550-890KC, 890-1570KC, 890-1570KC and 1000-1740KC.

1. Turn receiver on and allow it to warm up for at least fifteen minutes.
2. Make up a list of stations desired to be set up making sure that each station falls within the frequency range of its button.
3. Depress the manual button and manually tune in first station desired to be set up.
4. Depress 1st button and adjust B1 until desired station is tuned in.
5. Adjust B2 for maximum volume.
6. To check accuracy of setting alternately depress manual button and 1st button several times while readjusting both B1 & B2 for best reception.
7. To set up the remaining buttons follow the procedure outline above, adjusting B3, B5, B7 & B9 to tune station & B4, B6, B8 and B10 for maximum volume.

FIG. 1

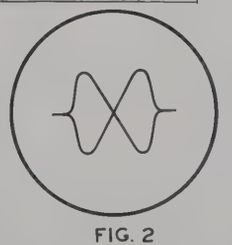
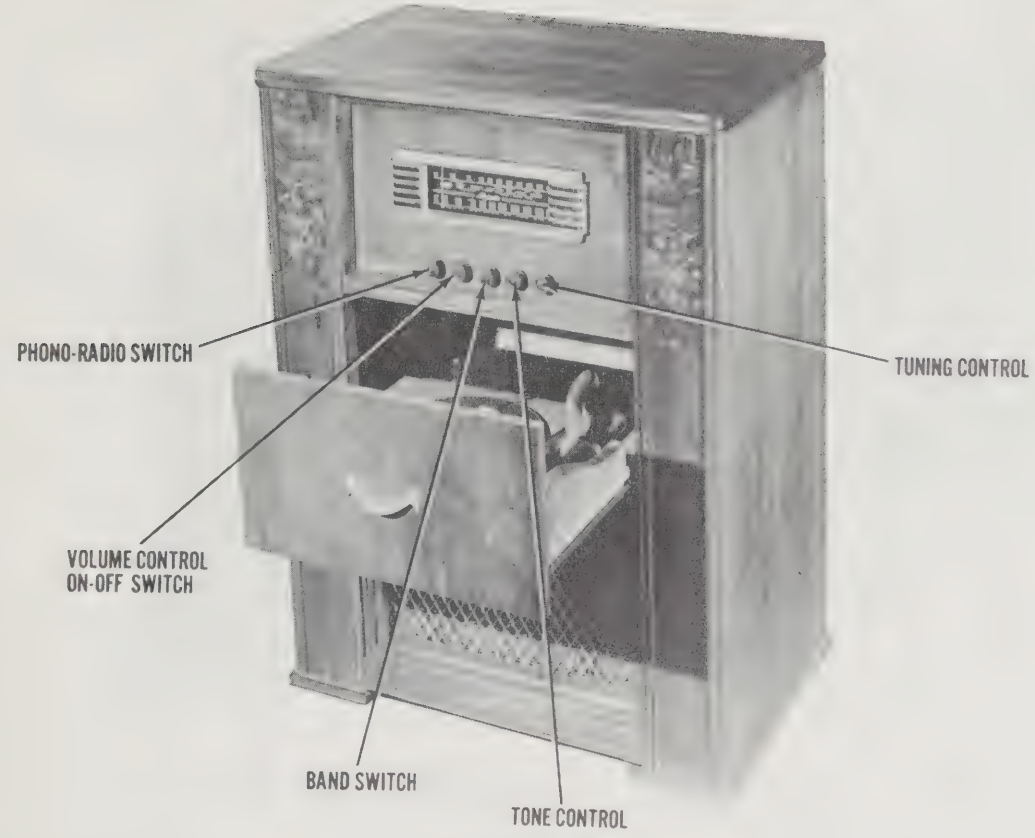


FIG. 2

DISASSEMBLY INSTRUCTIONS

1. Remove five push-on type control knobs from tuning chassis.
2. Remove loop antenna leads from loop antenna.
3. Remove loop antenna ground lead from clip on rear of tuning chassis.
4. Remove phono-pickup plug from rear of tuning chassis.
5. Remove FM dipole leads from terminal strip on rear of tuning chassis.
6. Remove power and audio plugs from power supply chassis.
7. Remove four machine screws holding tuning chassis in cabinet. Remove tuning chassis from cabinet.
8. Remove speaker and phono-motor plugs from power supply chassis.
9. Remove recording amp. power plug from power supply chassis.
10. Remove four machine screws holding power supply chassis in cabinet. Remove chassis from cabinet.
11. Remove two wood screws holding loop antenna in cabinet. Remove loop antenna from cabinet.
12. Remove four machine screws holding speaker in cabinet. Remove speaker from cabinet.
13. Remove two push-on type control knobs from recording amp. chassis.
14. Remove recording head plug from recording amp. chassis.
15. Remove four flat head machine screws holding recording amp. chassis in cabinet. Remove chassis from cabinet.



MAJESTIC MODEL
8JL885 (Ch. 4810B)

MAJESTIC MODEL
8JL885 (Ch. 4810B)

MAJESTIC MODEL 8JL885

TRADE NAME	Majestic, Model 8JL885 (Ch. 4810B)
MANUFACTURER	Majestic Radio & Tele. Corp., Elgin, Ill.
TYPE SET	AC Operated Combination Phono-Radio, 2 Band Superheterodyne Receiver with Loop Ant.
TUBES (EIGHT)	Types, 6SA7 Converter, 6SK7 IF Amp., 6SQ7GT Det.-AVC-AF, 6J5 AVC, 6J5 Phase Inv., (2) 6K6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC — RATING .67 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1720KC — SHORT WAVE 5.0MC - 19.0MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 8 (grid) of 6SA7 Low side to chassis.	455KC	BC (Clock-wise)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output
2		Loop	1500KC	"	1500KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	"	"	Tune for maximum output.	"	A6	Adjust for maximum output
4		"	600KC	"	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 and 4 until no further improvement can be made.
5	400Ω carbon res.	High side to ext. ant. terminal. Low side to chassis.	17MC	SW (Counter-clock-wise)	17MC	"	A8	Adjust for maximum output.
6	"	"	"	"	Tune for maximum output.	"	A9	Rock tuning cap. and adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MAJESTIC MODEL 5JL98

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: MAJESTIC PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	6SA7	6SA7	8R	
2	IF Amp.	6SK7	6SK7	9N	
3	Det.-AF	6SQ7GT	6SQ7GT	8Q	
4	AVC	6J5	6J5	6Q	
5	Phase Inverter	6J5	6J5	6Q	
6	Power Output	6K6GT	6K6GT	7S	
7	" "	6K6GT	6K6GT	7S	
8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MAJESTIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	16	450	19-16	PRSA450/16-16	BRD1R45	DH-2x16-450SS	TU-1616	Filter
B	16	450						"
10	.01	400	6-132	484-01	DT4S1	ST-4-01	TC-11	Line Filter
11	.001	400	6-133	484-001	DT6D1	ST-6-001	TC-21	Output Plate Bypass
12	.01	400	6-132	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
13	.01	400	6-132	484-01	DT4S1	ST-4-01	TC-11	" "
14	.01	400	6-132	484-01	DT4S1	ST-4-01	TC-11	" "
15	.05	200	5-40	484-05	DT2S5	ST-4-05	TC-15	Bias Filter
16	.006	400	6-133	484-006	DT6D6	ST-6-006	TC-26	Tone Comp.
17	.01	400	6-132	484-01	DT4S1	ST-4-01	TC-11	" "
18	.006	400	6-133	484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
19	.01	400	6-132	484-01	DT4S1	ST-4-01	TC-11	" "
20	.01	400	6-132	484-01	DT4S1	ST-4-01	TC-11	Conv. Screen Bypass
21	.05	200	5-40	484-05	DT2S5	ST-4-05	TC-15	IF Cathode Bypass
22	.05	600	5-77	684-05	DT6S5	ST-6-05	TC-15	Conv. Plate Decoup.
23	.1	200	5-30	484-.1	DT2P1	ST-2-1	TC-1	AVC Filter
24	100	500	6-232	1468-0001	SW5T1	MO.5-31	1FM-31	AF Plate Bypass
25	100	500	6-232	1468-0001	SW5T1	MO.5-31	1FM-31	IF Coupling
26	47	500	6-156	1468-00005	SW5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
27	6900	500	6-177					Fixed Padder

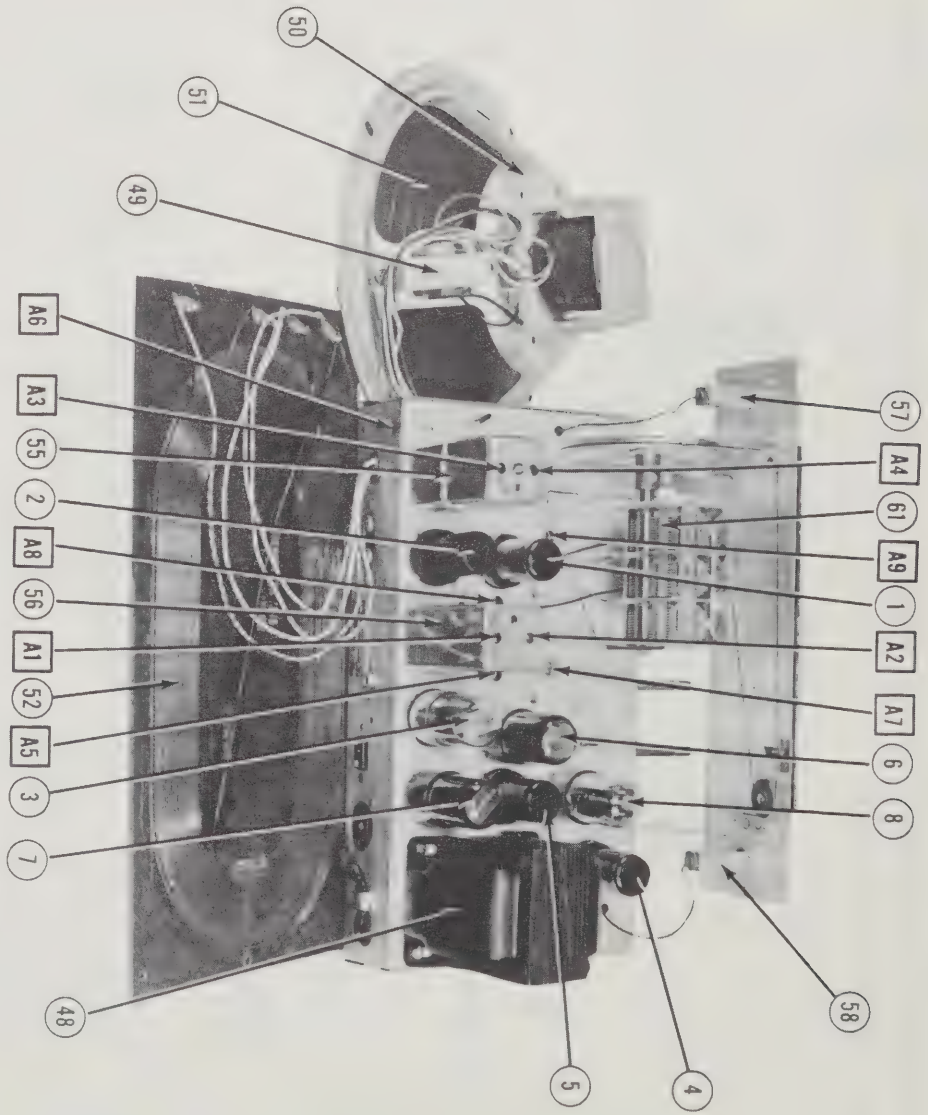
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
28A	2 Meg.	½	13-15	D13-139X	AT-115	Volume Control tapped @ 600KΩ
B	Shaft		Not Req.	E	KSS-3	Attach to 28A per instructions
C	Switch		" "	41	SW-A	" " " " "
29A	2 Meg.	½	14-4		AM-83-3	Tone Control
B	Shaft		Not Req.		KSS-3	Attach to 29A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MAJESTIC PART No.	IRC PART No.	IDENTIFICATION CODES
30	22KΩ	½	9-190	BTS-22K	Red-Red-Or. Osc. Grid
31	15KΩ	2	9-299	BT-2-15K	Br.-Grn.-Or. Conv. Screen
32	10KΩ	½	9-17	BTS-10K	Br.-Blk.-Or. Conv. Plate Decoup.
33	180Ω	½	9-272	BTS-180	Br.-Gray-Br. IF Cathode
34	1 Meg.	½	9-255	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
35	1 Meg.	½	9-255	BTS-1 Meg.	Br.-Blk.-Grn. " "
36	18KΩ	½	9-225	BTS-18K	Br.-Gray-Or. Tone Comp.
37	10 Meg.	½	9-213	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
38	470KΩ	½	9-227	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
39	470KΩ	½	9-227	BTS-470K	Yl.-Vi.-Yl. Phase Inv. Grid
40	220KΩ	½	9-220	BTS-220K	Red-Red-Yl. Phase Inv. Grid
41	2200Ω	½	9-107	BTS-2200	Red-Red-Red Phase Inv. Cathode
42	18KΩ	½	9-95	BTS-18K	Br.-Gray-Or. Phase Inv. Cathode
43	22KΩ	½	9-180	BTS-22K	Red-Red-Or. Phase Inv. Plate Load
44	470KΩ	½	9-227	BTS-470K	Yl.-Vi.-Yl. Output Grid
45	470KΩ	½	9-227	BTS-470K	Yl.-Vi.-Yl. " "
46	390Ω	2	9-185	BW-2-390	Or.-White-Br. Output Cathode
47	2.2 Meg.	½	9-296	BTS-2.2 Meg.	Red-Red-Grn. Feedback

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MAJESTIC PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
48	117V AC @ .67A	680V CT .086ADC	5.2V AC @ 2.0A	6.6V AC @ 2.6A	2-12-D			

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MAJESTIC PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
49	9000Ω CT	4Ω	400Ω CT	.5Ω	Part of 22-14-H	A-3823	T22S56*	A-2936	*Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MAJESTIC PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD RES.	VC IMP.		ST-745		
50	635Ω	4Ω	22-14-H	Mod. F-10-S	10E60#	#Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
51	9-11/16"	1"				

R F COILS

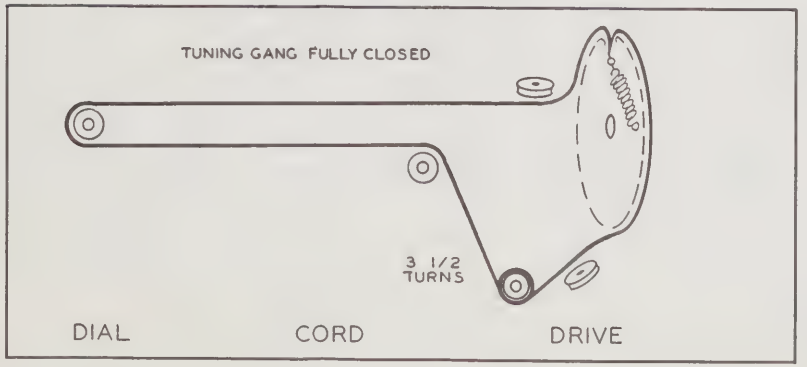
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MAJESTIC PART No.	MEISSNER PART No.	
52	Loop Ant.					
53	SW Ant.Coil	.5Ω	0Ω	3-20		
54A	BC Osc.Coil		5.5Ω	3-1[illegible]		
B	SW " "		.1Ω			
55	Input IF	11Ω	11Ω	3-165	16-6658	*Add 470K resistor from junction of IF lead and cap (19) to chassis.
56	Output IF	11Ω		3-166	16-6670*	

DIAL LIGHT

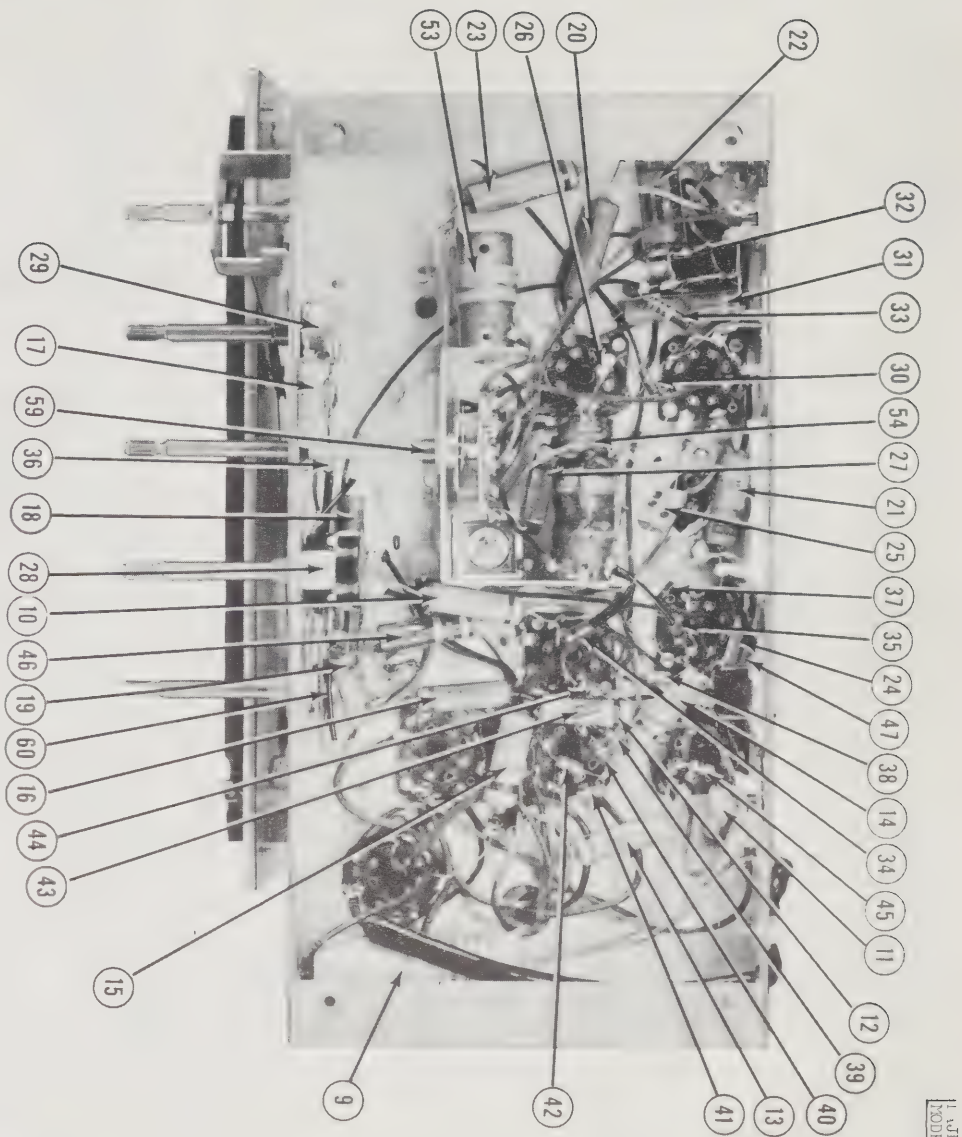
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					MAJESTIC PART No.		
57	Bayonet	6-8	0.15	Brown			Type #47
58	"	6-8	0.15	"			" "

MISCELLANEOUS

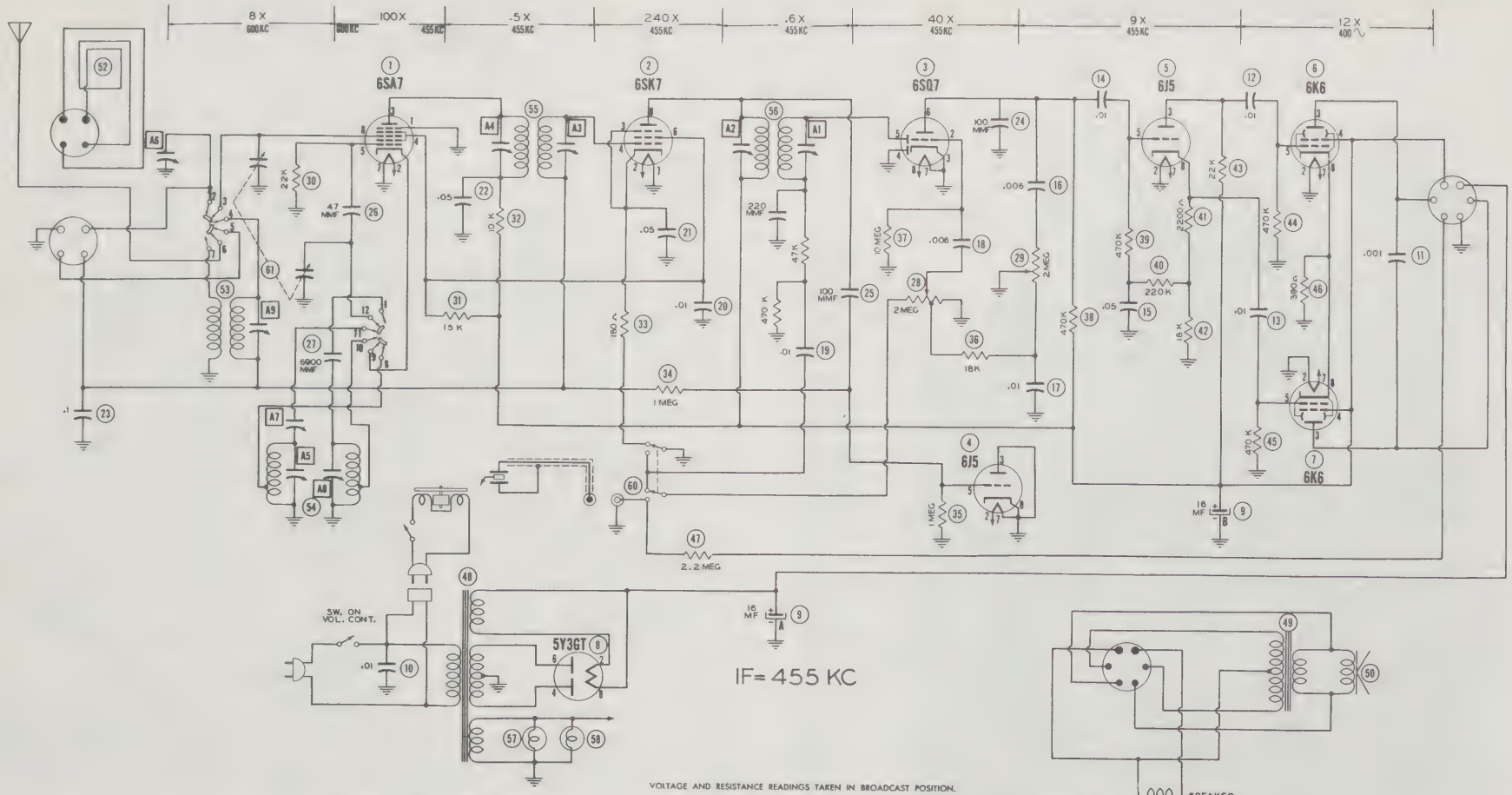
ITEM No.	PART NAME	MAJESTIC PART No.	NOTES
59	Switch	11-46	Band
60	"	11-45	Radio-Phono
61	Tuning Gang	7-22	(17-500MMF, 17-[illegible] MMF)



CHASSIS—BOTTOM VIEW



DATE 10/48-#4617-11 SET #47-FOLDER #11
MAJESTIC MODEL 8JL88
MAJESTIC MODEL 8JL88



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0V.	0V.	260VDC	110VDC	-6.8VDC§	0V.	6.6VAC	-.4VDC
2	6SK7	0V.	0V.	2.5VDC	-.2VDC	2.5VDC	115VDC	6.6VAC	280VDC
3	6SQ7GT	0V.	-.4VDC	0V.	0V.	-.3VDC	85VDC	6.6VAC	0V.
4	6J5	0V.	0V.	0V.	85VAC	-.8VDC	0V.	6.6VAC	0V.
5	6J5	0V.	0V.	235VDC	50VDC	35VDC	60VDC	6.6VAC	65VDC
6	6K6GT	0V.	0V.	280VDC	290VDC	0V.	-.1VDC	6.6VAC	25VDC
7	6K6GT	0V.	0V.	280VDC	290VDC	0V.	0V.	6.6VAC	25VDC
8	5Y3GT	0V.	350VDC	0V.	340VAC	0V.	340VAC	0V.	350VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SA7	0Ω	0Ω	1.0KΩ	110KΩ	22KΩ	.5Ω	.1Ω	2 Meg.
2	6SK7	0Ω	0Ω	1.0Ω	2 Meg.	180Ω	110K.	.1Ω	.5K.
3	6SQ7GT	0Ω	10 Meg.	0Ω	0Ω	520K.	560KΩ	.1Ω	0Ω
4	6J5	0Ω	0Ω	0Ω	INF.	1 Meg.	INF.	.1Ω	0Ω
5	6J5	0Ω	0Ω	110KΩ	280KΩ	110KΩ	20K.	.1Ω	350Ω
6	6K6GT	0Ω	0Ω	90KΩ	90KΩ	470K.	2 Meg.	.1Ω	300Ω
7	6K6GT	0Ω	0Ω	90KΩ	90KΩ	47 K.	INF.	.1Ω	300Ω
8	5Y3GT	INF.	90KΩ	2.5 Meg.	1.5Ω	INF.	0Ω	INF.	0Ω

RADIO-PHONO SWITCH IN RADIO POSITION.
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

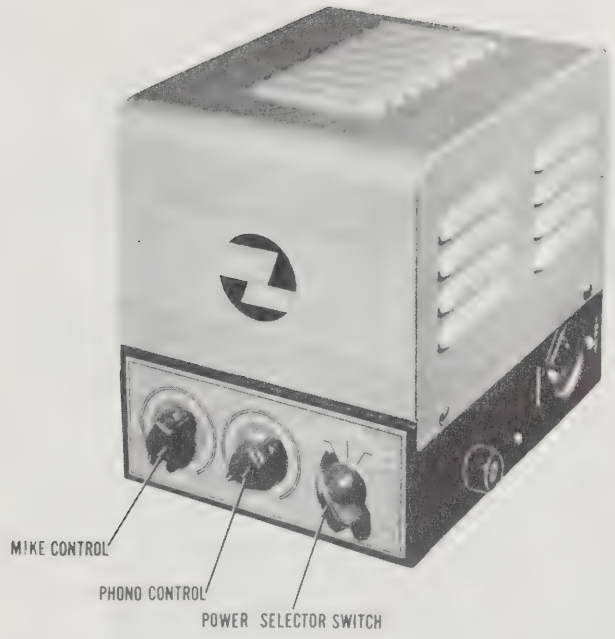
© Howard W. Sams & Co., Inc. 1948

4817-11

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

MASCO
MODEL MC-10



MASCO MODEL MC-10

TRADE NAME	Masco, Model MC-10
MANUFACTURER	Mark Simpson Mfg. Co., Inc., 32-28 49th St., Long Island City 3, N.Y.
TYPE SET	AC or Battery Operated Mobile Audio Amplifier
TUBES (FIVE)	Types, 6SF5 Mic. Amp., 6SL7GT AF-Phase Inv., (2) 6V6GT Power Output, 7Z4 Rectifier.
POWER SUPPLY RATING	110-120 Volts AC or 6 Volt Storage Battery .52 Amp. @ 117 Volts AC or 8 Amps. @ 6.3 Volts DC

VOLTAGE AND RESISTANCE READINGS TAKEN IN AC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SF5	0V.	0V.	-.6VDC	0V.	85VDC	0V.	3VAC	3VAC
2	6SL7GT	0V.	100VDC	1.4VDC	0V.	105VDC	.9VDC	3VAC	3VAC
3	6V6GT	0V.	3VAC	305VDC	280VDC	0V.	0V.	3VAC	18VDC
4	6V6GT	0V.	3VAC	305VDC	280VDC	0V.	0V.	3VAC	18VDC
5	7Z4	3VAC	0V.	293VAC	0V.	280VDC	293VAC	320VDC	3VAC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SF5	0Ω	0Ω	3 Meg.	INF.	470KΩ	INF.	.05Ω	.05Ω
2	6SL7GT	130KΩ	440KΩ	5KΩ	10KΩ	275KΩ	1KΩ	.05Ω	.05Ω
3	6V6GT	0Ω	.05Ω	120KΩ	125KΩ	280KΩ	10KΩ	.05Ω	250Ω
4	6V6GT	0Ω	.05Ω	120KΩ	125KΩ	270KΩ	INF.	.05Ω	250Ω
5	7Z4	.05Ω	INF.	125Ω	INF.	125KΩ	120Ω	120KΩ	.05Ω

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - All controls at minimum, proper output load connected.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MASCO MODEL MC-1

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MASCO PART No.	STANDARD REPLACEMENT		
1	Mic. Amp.	6SF5	6SF5	6AB	
2	AF-Phase Inv.	6SL7GT	6SL7GT	8BD	
3	Power Output	6V6GT	6V6GT	7AC	
4	" "	6V6GT	6V6GT	7AC	
5	Rectifier	7Z4	7Z4	5AB	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MASCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
6A	8	450		PRSA450/8-8	EDL8845	M-2x8-450	UT-88	Filter
B	8	450						"
7A	8	450		PRSA450/8-8	EDL8845	M-2x8-450	UT-88	Decoupling
B	8	450						"
8	10	50		PRS50/10	BR105	M-10-50	TA-510	Output Cathode Bypass
9	10	50		PRS50/10	BR105	M-10-50	TA-510	AF Cathode Bypass
10	.05	600		684-.1	DT6S5	ST-6-05	TC-15	Hash Filter
11	.1	600		684-.1	DT6P1	ST-6-1	TC-1	" "
12	.1	600		1684-.006	DT6P1	ST-6-1	TC-1	" "
13	.006	1600			MD16D6	STM-16-006	TR-26	Buffer
14	.01	600		684-.01	DT6S1	ST-6-01	TC-11	Audio Coupling
15	.01	600		684-.01	DT6S1	ST-6-01	TC-11	" "
16	.01	600		684-.01	DT6S1	ST-6-01	TC-11	" "
17	.005	600		684-.005	DT6D5	ST-6-005	TC-25	" "

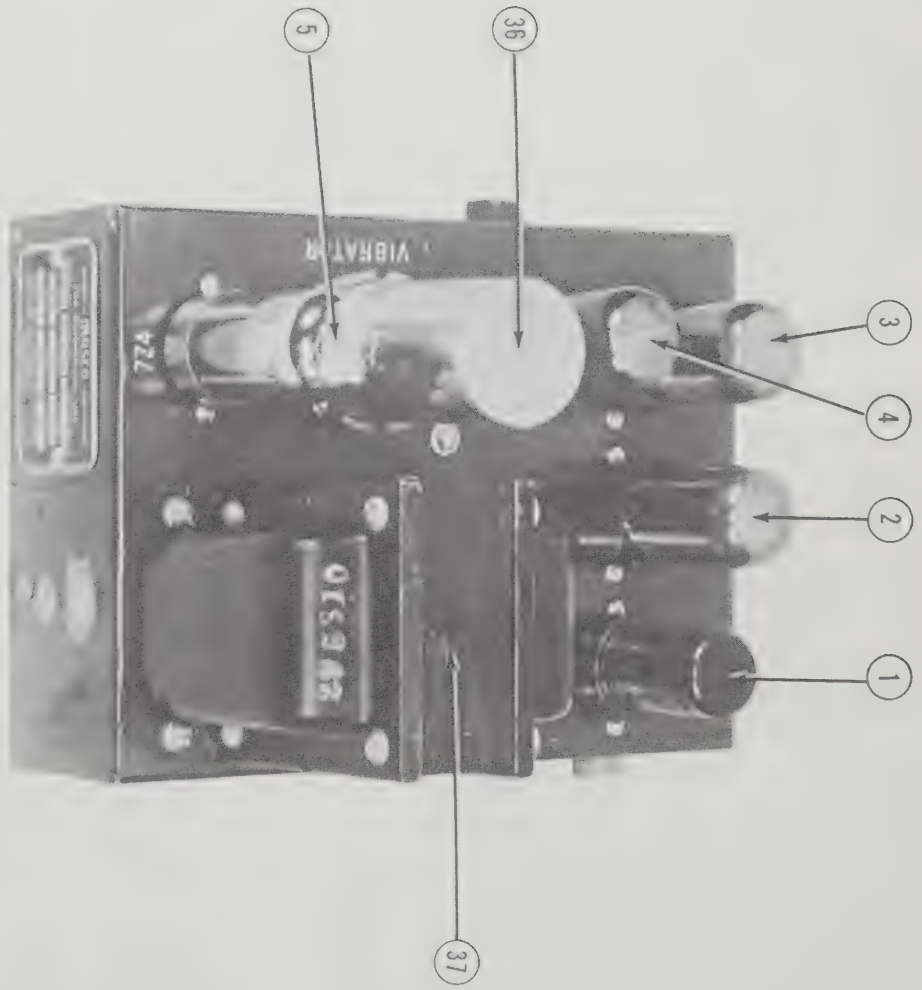
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	CLAROSTAT PART No.	
18A	500KΩ	½		D13-133	M-60-Z	Mike Control
B	Shaft			A	Not Req.	Attach to 18A per instructions
19A	500KΩ	½		D13-133	M-60-Z	Phono Control
B	Shaft			A	Not Req.	Attach to 19A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
20	3 Meg.	½		BTS-3.3 Meg.	Or.-Blk.-Grn. Mic. Amp. Grid
21	270KΩ	½		BTS-270K	Red-Vi.-Yl. Mic. Amp. Plate Load
22	270KΩ	½		BTS-270K	Red-Vi.-Yl. Isolation
23	270KΩ	½		BTS-270K	Red-Vi.-Yl. Isolation
24	4700Ω	½		BTS-4700	Yl.-Vi.-Red AF Cathode
25	270KΩ	½		BTS-270K	Red-Vi.-Yl. AF Plate Load
26	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Phase Inv. Plate Load
27	1000Ω	½		BTS-1000	Br.-Blk.-Red Phase Inv. Cathode
28	10KΩ	½		BTS-10K	Br.-Blk.-Or. Phase Inv. Grid
29	27KΩ	½		BTS-27K	Red-Vi.-Or. Decoupling
30	270KΩ	½		BTS-270K	Red-Vi.-Yl. Output Grid
31	270KΩ	½		BTS-270K	Red-Vi.-Yl. " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MASCO PART No.	IRC PART No.	
32	22KΩ	½		EW-2-22K	Red.-Red.-Or.
33	47KΩ	½		ETS-47K	Yl.-Vi.-Or.
34	10KΩ	½		ETS-10K	Br.-Blk.-Or. Filter
35	10KΩ	½		EW-1-10K	Br.-Blk.-Or. Filter

Note-Some models use two 4702 1 watt resistors in parallel in this application.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA		INSTALLATION NOTES
				MASCO PART No.	RADIART PART No.	
36	Interrupter	6.3 VDC	115 ~		5300	

TRANSFORMER (POWER)

ITEM No.	RATING (AC)				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	MASCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
37	117V AC @ .52A	585V CT @ .07A DC	6.1V AC @ 1.6A		P-10M			
	RATING (DC)							
	6.3V DC @ 5.5A	585V CT @ .07A DC						

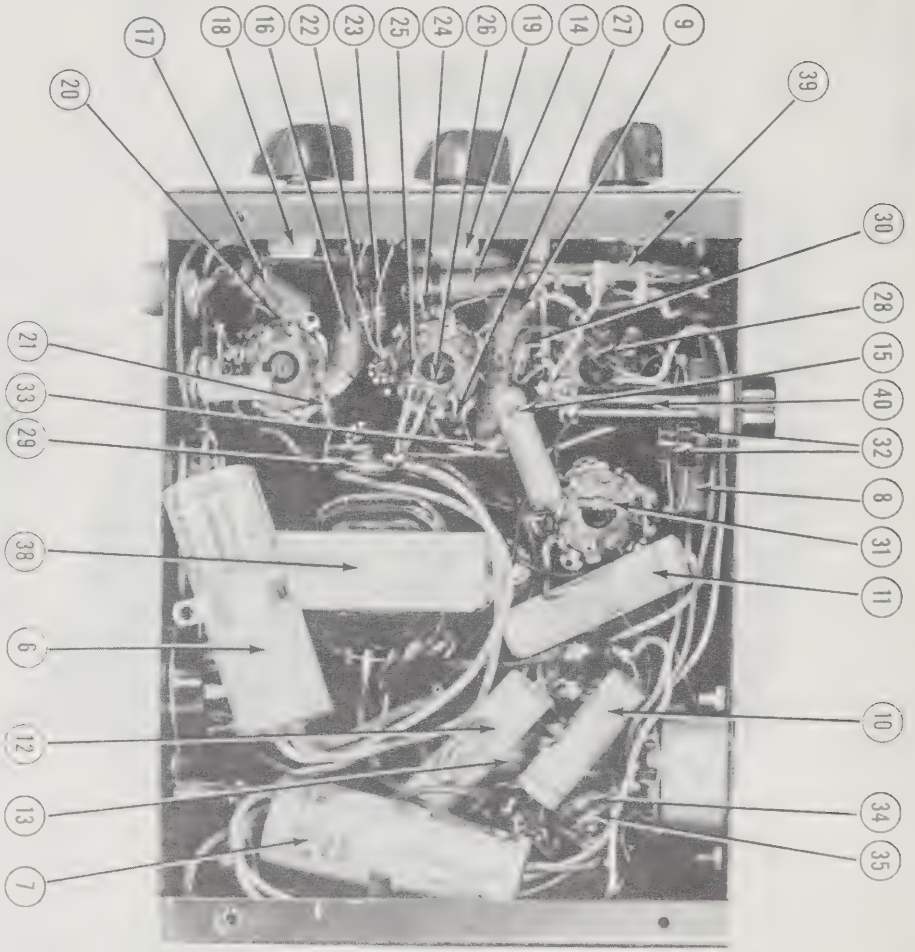
TRANSFORMER (OUTPUT)

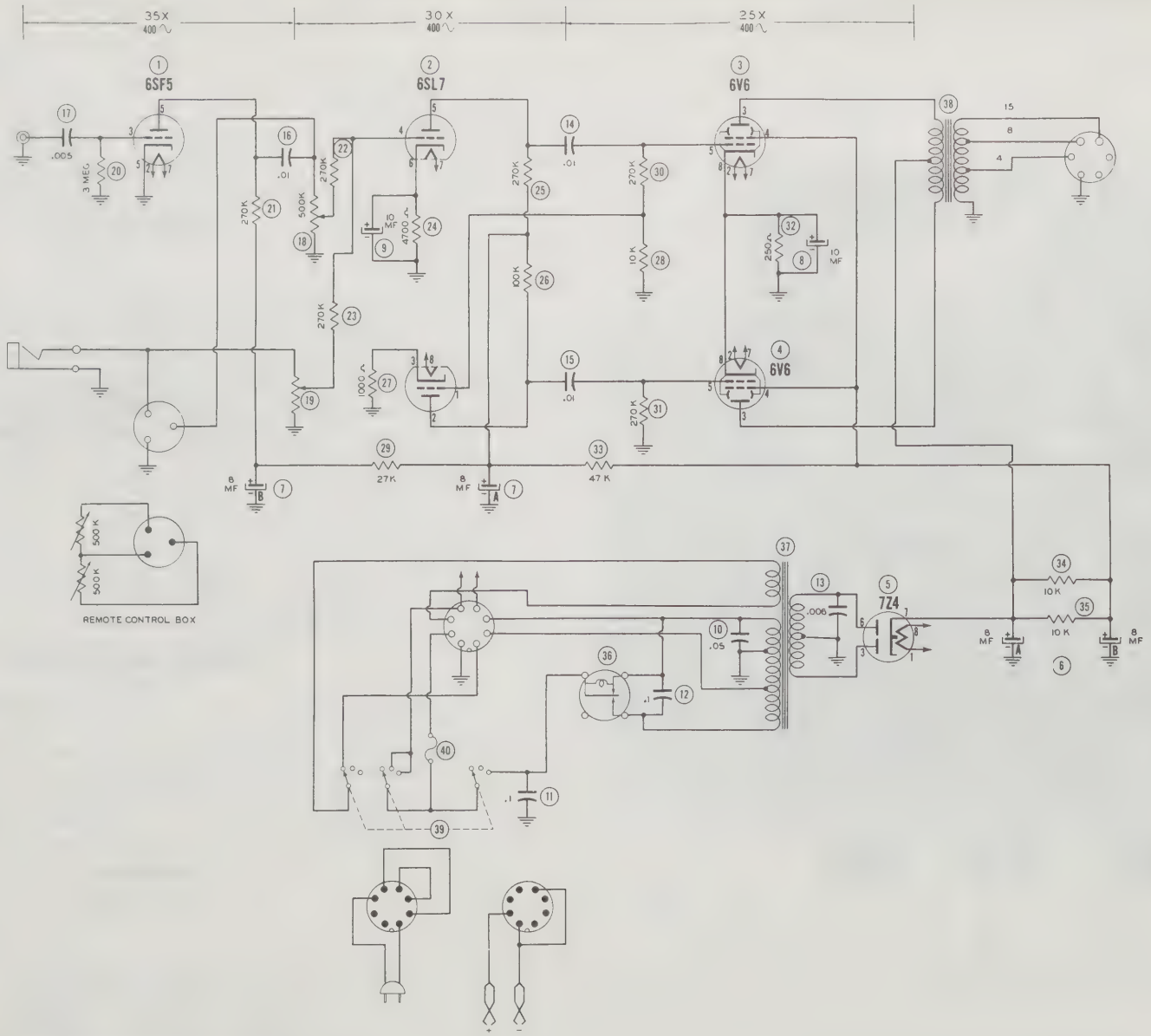
ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MASCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
38	10KΩ CT	4Ω 8Ω 16Ω	540Ω CT	.4Ω .5Ω .9Ω	T-10T	A-8324		A-3027	

MISCELLANEOUS

ITEM No.	PART NAME	MASC PART No.	NOTES
F1	Switch Fuse		Power 10 Amp. 32 Volt

CHASSIS—BOTTOM VIEW





A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co. Inc. 1948

4817-12

MOTOROLA MODEL 48L11
(Ch. HS-113) BATTERY OPERATED

MOTOROLA MODEL 48L11
(Ch. HS-113) BATTERY OPERATED

MOTOROLA MODEL 48L11

TRADE NAME	Motorola, Model 48L11 (Ch. HS-113)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago, Ill.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3S4 Power Output.
POWER SUPPLY RATING	1.5 Volts "A" Supply and 67.5 Volts "B" Supply 94 MA @ 1.5 Volts DC and 8MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to stator of large section of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output.
2	.1 MFD.	"	1620KC	"	"	A4	Adjust for maximum output. Reinstall receiver in cabinet.
3		Loop	1400KC	Tune for maximum output.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MOTOROLA
TCDEL 4:L11

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3S4	3S4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5	10	100	23A75235	PRS150/12	BR1215	M-10-150	UT-121	Power Supply Bypass
6	.006	100	8C4529	484-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
7	.006	100	8C4529	484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
8	.006	100	8C4529	484-006	DT6D6	ST-6-006	TC-26	" "
9	.02	100	8K471628	484-02	DT2S2	ST-4-02	TC-12	AF Screen Bypass
10	.02	100	8K471628	484-02	DT2S2	ST-4-02	TC-12	RF Bypass Pwr. Supply
11	.02	100	8K471628	484-02	DT2S2	ST-4-02	TC-12	Osc. Decoupling
12	.05	100	8A71213	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
13	100	500	21B77286	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
14	100	500	21B77286	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	
15A	1 Meg.	½	18K480039	D13-137	AM-63-2	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 15A per instructions
C	Switch		" "	42	SW-A2	" " " " "

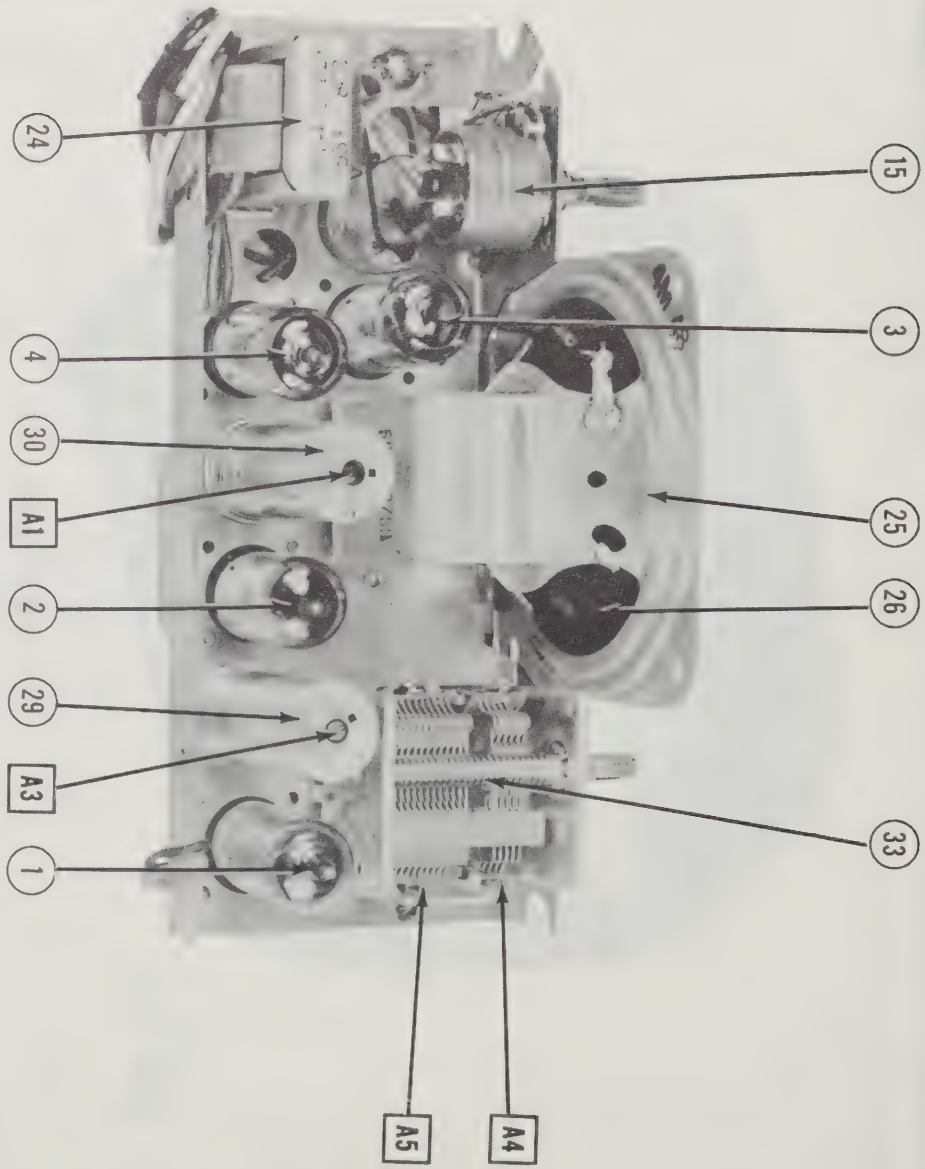
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	
16	100KΩ	½	6R6031	BTS-100K	Br.-Blk.-Yl. Osc. Grid
17	22KΩ	½	6R6397	BTS-22K	Red-Red-Or. Conv. Screen
18	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Or.-Or.-Grn. AVC Network
19	10 Meg.	½	6R2109	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
20	4.7 Meg.	½	6R2102	BTS-4.7 Meg.	Yl.-Vi.-Grn. AF Screen
21	1 Meg.	½	6R6004	BTS-1 Meg.	Br.-Blk.-Grn. AF Plate
22	3.3 Meg.	½	6R2118	BTS-3.3 Meg.	Or.-Or.-Grn. Output Grid
23	820Ω	½	6R6269	BTS-820	Gray-Red-Br. Bias

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		MOTOROLA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
24	5700Ω	3.1Ω	365Ω	.5Ω	25B470662				

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
25A	PM	3.1Ω	50B432759		3A07#	#Drill and tap magnet frame.
B			50B480048			Alternate
C			50B480050			"
	CONE DIA.	VC DIA.				
26	3-3/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	
27	Loop Ant.		3.2Ω	24B480092		
28	Osc. Coil	2.5Ω	10Ω	24A478022		
29	Input IF	29.2Ω	29.7Ω	24B480042	16-6668	
30	Output IF	44Ω	44.3Ω	24B480040	16-6669	

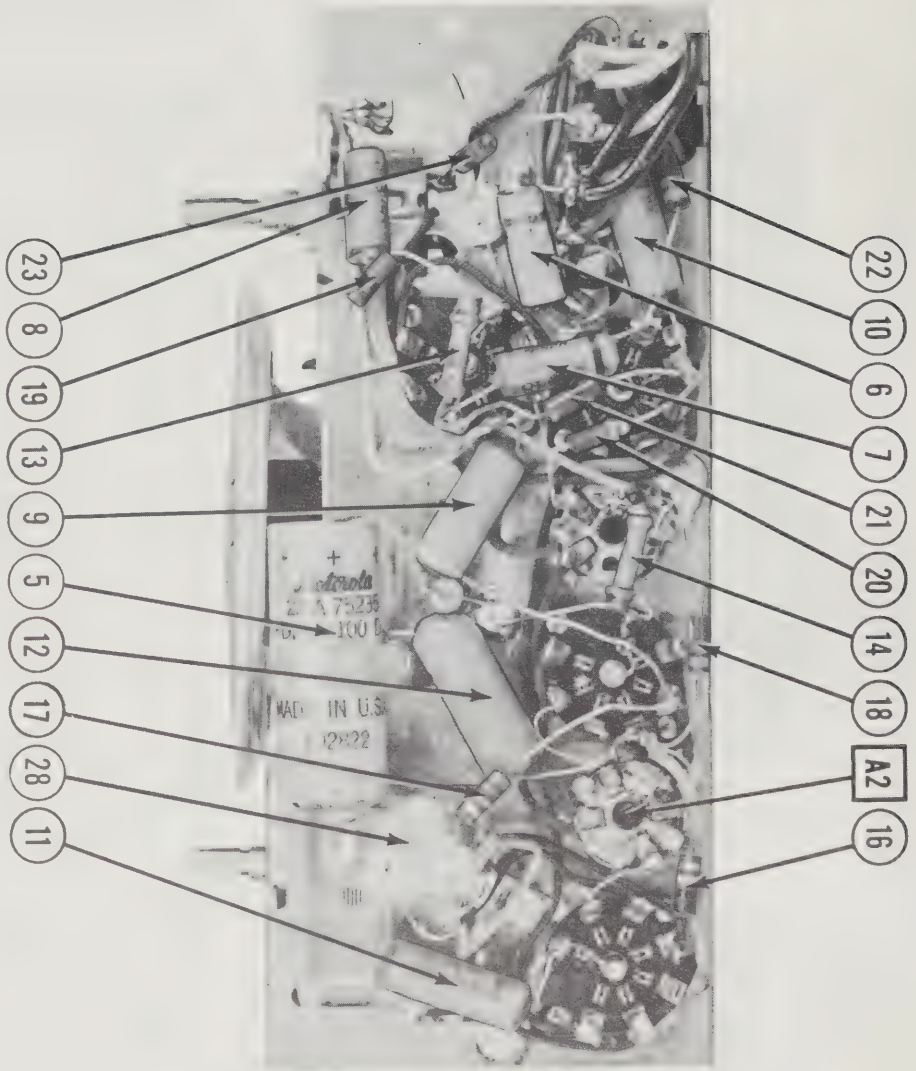
BATTERIES

ITEM No.	VOLTAGE	MOTOROLA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
31	1.5V "A"		950			2R			2 Used in parallel
32	67.5V"B"			467			XX45		

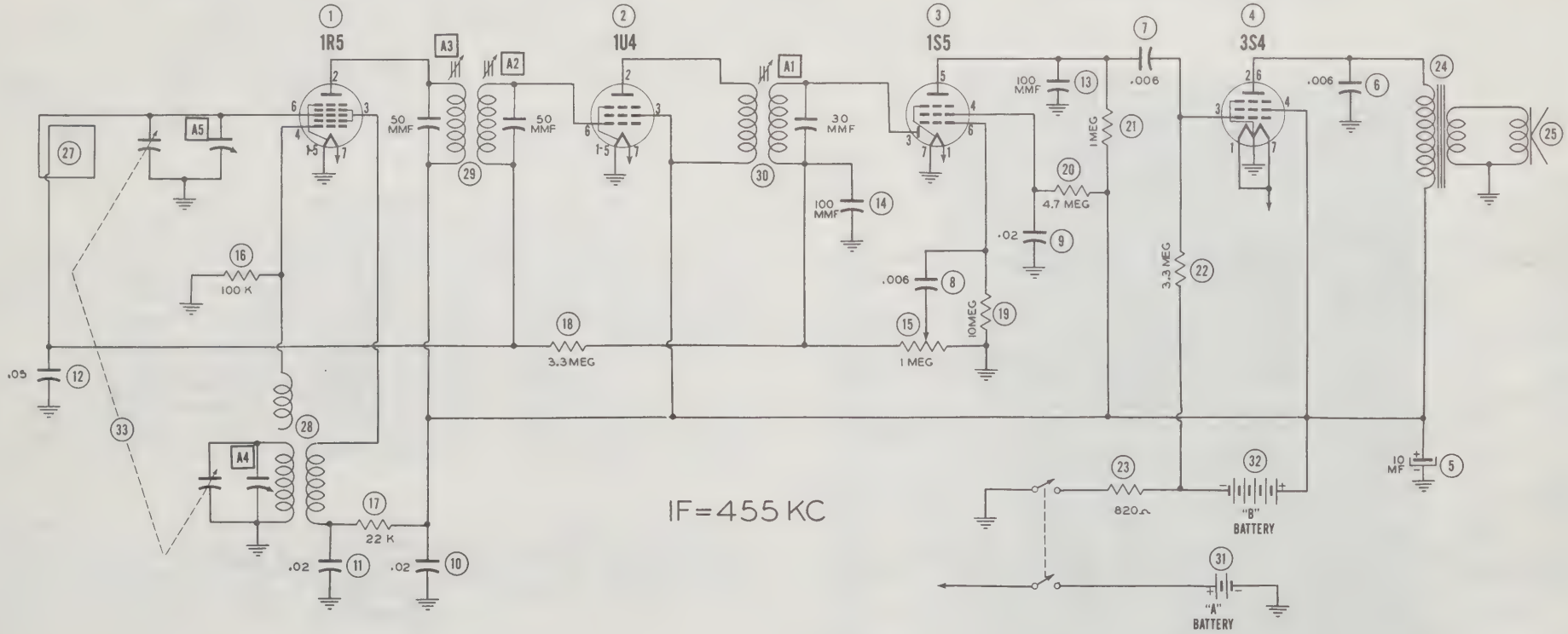
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
33	2 Gang Var. Cap.	19K480051	(20-378MMF, 10-100MMF)
	Cabinet	1X481314	Less Back Cover
	Cover	16D480088	Back
	Handle	5[illegible]478415	Carrying
	Knob	30B490195	Control

CHASSIS—BOTTOM VIEW



MOTOROLA MODEL 48L11



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0V.	60VDC	30VDC	-7.6VDC§	0V.	0V.	1.4V DC
2	1U4	0V.	60VDC	60VDC	0V.	0V.	0V.	1.4VDC
3	1S5	0V.	0V.	-.1VDC	10VDC	17VDC	0V.	1.4VDC
4	3S4	1.4VDC	58VDC	-.4VDC	60VDC	0V.	58VDC	1.4VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	0Ω	200KΩ	220KΩ	100KΩ	0Ω	4.3 Meg.	*
2	1U4	0Ω	200KΩ	200KΩ	4.9 Meg.	0Ω	4.3 Meg.	*
3	1S5	0Ω	INF.	1 Meg.	4.9 Meg.	1.2 Meg.	10 Meg.	*
4	3S4	*	200KΩ	3.3 Meg.	200KΩ	0Ω	200KΩ	*

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

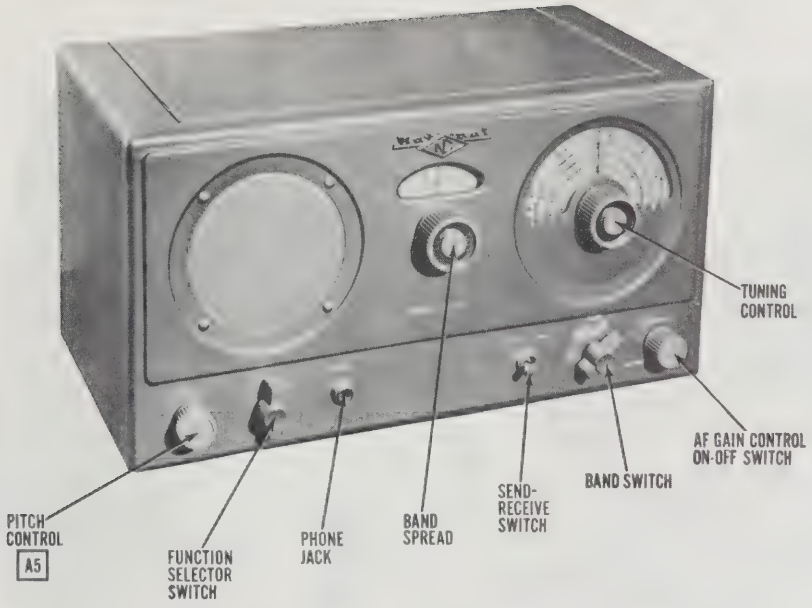
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

4817-13

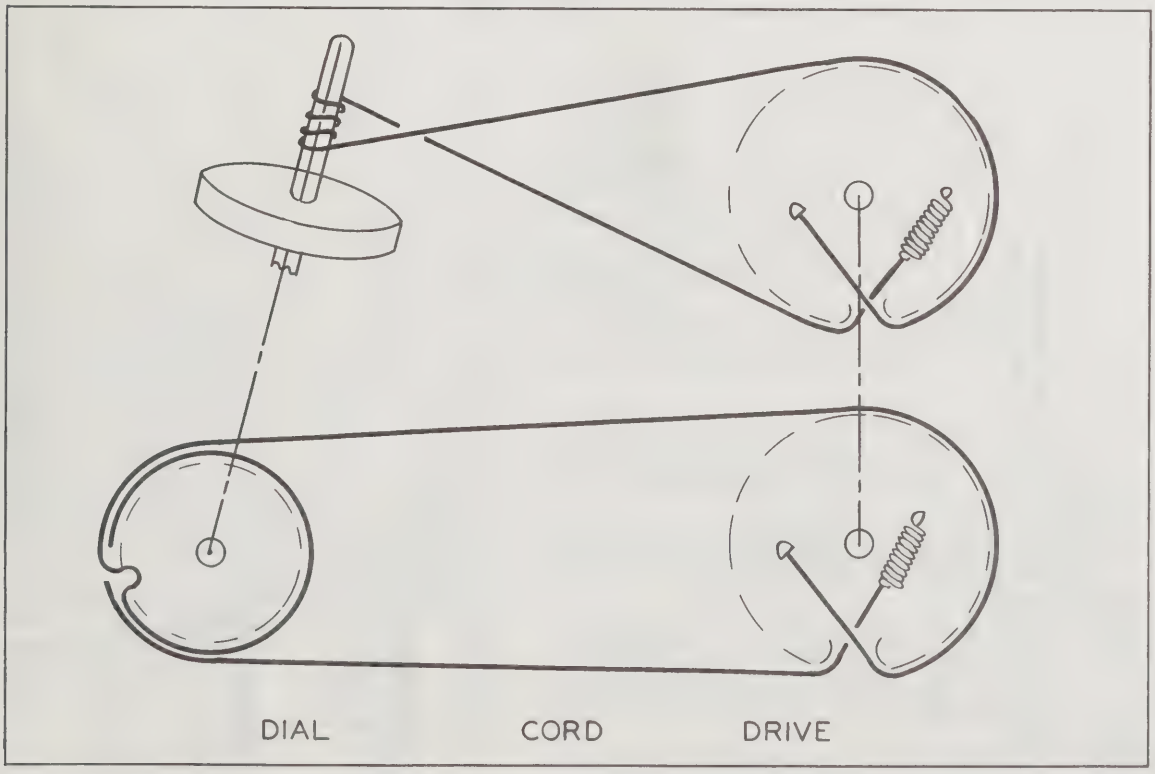
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

NATIONAL MODEL
NC-33



NATIONAL MODEL NC-33

TRADE NAME	National, Model NC-33
MANUFACTURER	National Co. Inc., 61 Sherman St., Malden, Mass.
TYPE SET	AC-DC Operated Multi-Band Commercial Type Superheterodyne Receiver
TUBES (SIX)	Types, 12SA7 Converter, 12SG7 IF Amp., 12H6 Det.-AVC-Noise Limiter, 12SL7GT AF Amp.,-BFO, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	105-130 Volts AC-DC RATING .22 Amp. @ 117 Volts AC
TUNING RANGE--BROADCAST	500-1420KC Bands "A"-12.0-35.0MC, "B"-4.0-12.0MC. "C"-1.42-4.2MC



HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SG7	12SG7	8BK	
3	Det.-AVC & Noise Lim.	12H6	12H6	7Q	
4	AF Amp. & BFO	12SL7GT	12SL7GT	8BD	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	40	150		AF88D	UP4415	DY-2x40-150	EL-224*	■ Filter
B	40	150					"	▲ "
8	10	50		PRS50/10	BR105	M-10-50	TA-510	Output Cathode Bypass
9	10	50		PRS50/10	BR105	M-10-50	TA-510	AF Cathode Bypass
10	.1	400		484-.1	DT4P1	MPH-4-1	TC-1	Line Filter
11	.1	400		484-.1	DT4P1	ST-4-1	72P2	Line Isolation
12	.03	600		684-03	DT6S3	ST-6-03	TC-13	Output Plate Byp.-See Note
13	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Noise Limiter Bias Filter
14	.01	400		484-01	DT4S1	ST-4-01	TC-11	IF Screen bypass
15	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AVC Filter
16	.01	400		484-01	DT4S1	ST-4-01	TC-11	" "
17	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Conv. Screen Bypass
18	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AVC Filter
19	.01	400		484-01	DT4S1	ST-4-01	TC-11	" "
20	.1	400		484-.1	DT4P1	ST-4-1	TC-1	RF Bypass
21	10000	500		1441W-01	1D3S1	MW.3-11	1FM-11	" "
22	5000	500		1441W-005	1D5D5	MW.5-25	1FM-25	Audio Coupling
23	270	500		1468-0003	5W5T3	MO.5-325	1FM-325	AF Plate Bypass
24	220	500		1469-0002	5R5T2	MOS.5-32	MS-32	Fixed Trimmer
25	270	500		1469-00025	5R5T25	MOS.5-325	MS-325	BFO Grid Cap.
26	10000	500		1441W-01				BFO Coupling
27	270	500		1468-00025	5W5T25	MO.5-325	1FM-325	Diode RF Filter
28	10000	500		1441W-01				Audio Coupling
29	470	500		1469-0005	5R5T5	MOS.5-35	MS-35	Osc. Grid Cap.
30	4300	500						Fixed Padder
31	1300	500						" "
32	510	500						" "
33	10000	500		1441W-01				RF Bypass

*Parallel sections to obtain desired capacity.
Note-Some models use two capacitors in parallel to obtain the desired capacity.

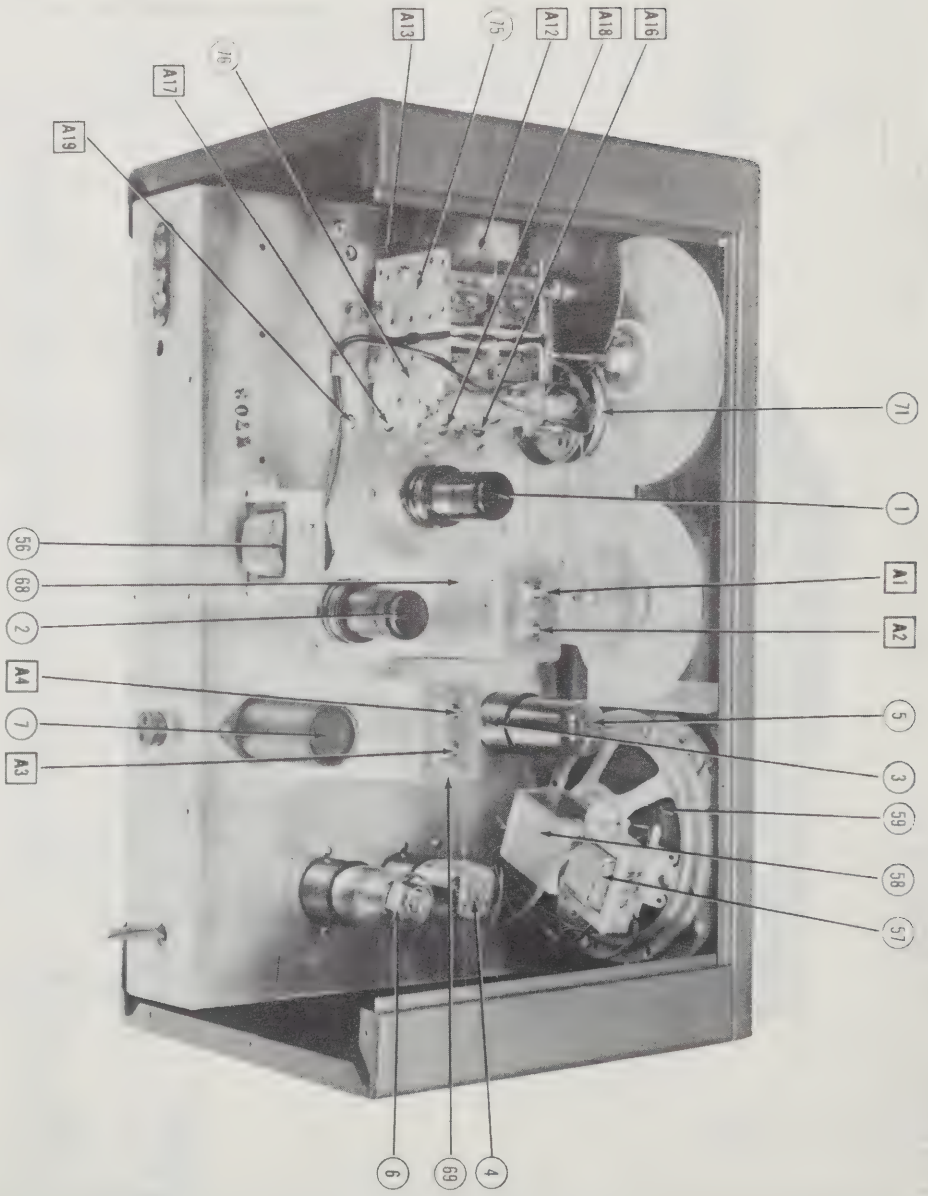
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: IRC PART No.	REPLACEMENT DATA: CLAROSTAT PART No.	INSTALLATION NOTES
34A	500KΩ	½		D13-133	M-60-Z	AF Gain Control
B	Shaft			A	Not Req.	Attach to 34A per instructions
C	Switch			41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: NATIONAL PART No.	REPLACEMENT DATA: IRC PART No.	IDENTIFICATION CODES
35	22KΩ	½		BTS-22K	Red-Red-Or. Osc. Grid
36	33Ω	½			Or.-Or.-Blk. Parasitic Supp.
37	150Ω	½			Br.-Grn.-Br. " "
38	1000Ω	½		BTS-1000	Br.-Blk.-Red Conv. Screen Decoup.
39	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
40	150Ω	½			Br.-Grn.-Br. IF Cathode
41	1000Ω	½		BTS-1000	Br.-Blk.-Red IF Screen
42	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Noise Limiter Bias Network
43	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. " " " "
44	270KΩ	½		BTS-270K	Red-Vi.-Yl. " " " "
45	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Diode Load

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	CATIONAL PART No.	IRC PART No.	
46	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
47	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Filament Shunt
48	47KΩ	½		BTS-47K	Yl.-Vi.-Or. BFO Plate Load
49	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Bias Network
50	3900Ω	½		BTS-3900	Or.-white-Red AF Cathode
51	220KΩ	½		BTS-220K	Red-Vi.-Yl. AF Plate Load
52	47K	½		BTS-47K	Yl.-Vi.-Or. CWO Grid
53	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
54	220Ω	½		BW-1-220	Red-Red-Br. Output Cathode
55	820Ω	½		BTS-820	Gray-Red-Br. Dial Light Shunt

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	NATIONAL PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
56	.085A	215Ω	5.5 Henries	K-317-2-1	C-1325	T20C82	C-2277	Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		NATIONAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
57	2000Ω	3.4Ω	110Ω	.4Ω	K-588-1	A-3876	T22S45	A-3876	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			NATIONAL PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.		ST-107		
58	PM	3.4Ω		Mod. P8-V	5A15	
	CONE DIA.	VC DIA.				
59	4-5/8"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA	
		PRI.	SEC.	NATIONAL PART No.	MEISSNER PART No.
	Band				
60	Ant. Coil D	2.6Ω	4.5Ω		
61	" " C	1Ω	1.7Ω		
62	" " B	0Ω	.3Ω		
63	" " A	0Ω	0Ω		
64	Osc. Coil D		1.8Ω		
65	" " C		.4Ω		
66	" " B		.1Ω		
67	" " A		0Ω		
68	Input IF	7.2Ω	7.5Ω		16-5740
69	Output IF	7.7Ω	7.8Ω		16-5742
70	BFO Coil		4.3Ω		

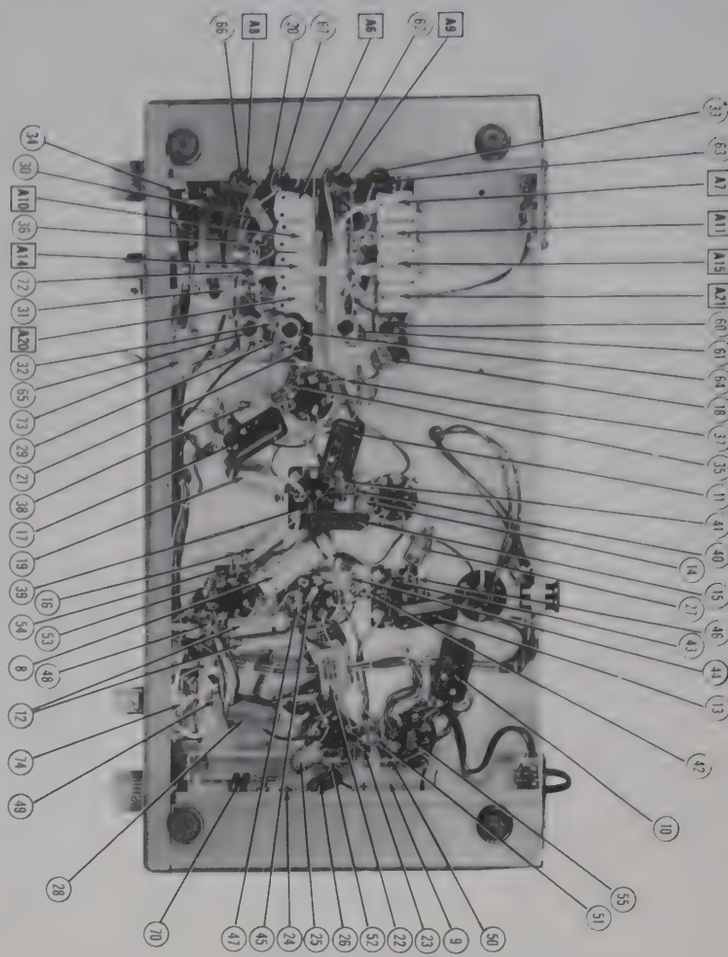
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					NATIONAL PART No.		
71	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
72	Switch		Band
73	"		Send-Receive
74	"		CW-Phone-ANL
75	Main Tuning Gang		
76	Bandspread Gang		

CHASSIS—BOTTOM VIEW

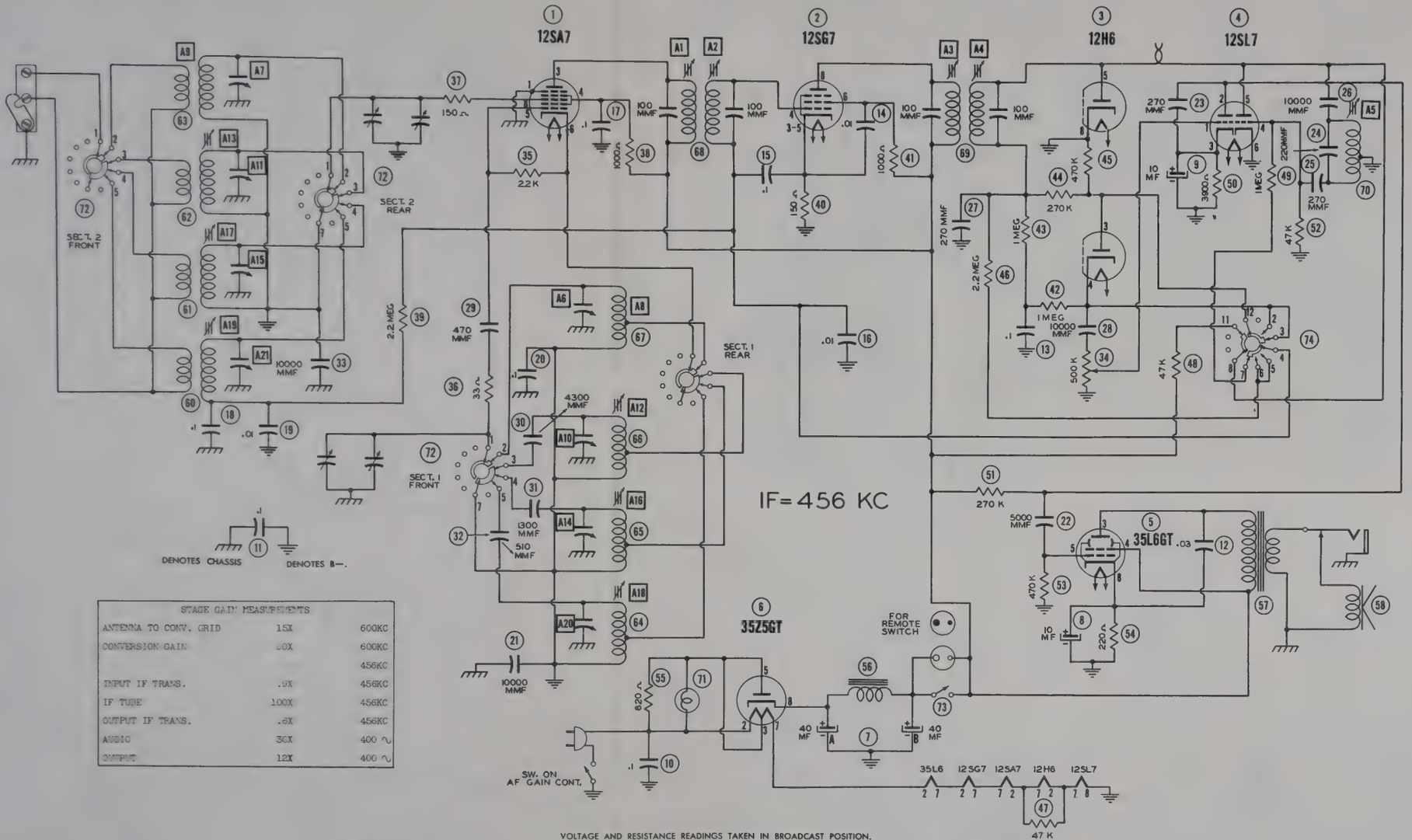


ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial. Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-. Set AF gain control at maximum, "Send-Rec" switch at rec., reception switch to phone, pitch control to midscale and bandspread dial to "set", except where otherwise noted. Output of sig. gen. should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for all adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	Direct	Across antenna terminals "A" with link disconnected.	456KC (Unmodulated)	Band "D"	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation. "CW"
2	Direct	"	456KC (Unmodulated)	"	"	"	A5	Reception switch to "CW". Loosen set screw on pitch control shaft and move A5 for zero beat. Replace white dot is at midscale. Place set screw directly opposite stop and tighten
3	500Ω carbon res.	High side to either ant. terminal. Low side to other ant. terminal with link disconnected	34MC	Band "A"	34MC	Across voice coil	A8	Check for image by tuning sig. gen. to 33.0MC. If signal is not heard retune sig. gen. to 34MC and close A8 to next peak
4	"	"	"	"	Tune for maximum output.	"	A7	Adjust for maximum output. Rock tuning cap. and adjust for maximum output.
5	"	"	12MC	"	12MC	"	A8, A9	Adjust for maximum output. Repeat steps 3 4 and 5 until no further improvement can be made.
6	"	"	11MC	Band "B"	11MC	"	A10	Adjust for maximum output. Check for image by tuning sig. gen. to 11.5MC. If signal is not heard, retune sig. gen. to 11MC and open A10 to next peak. Adjust for maximum output and recheck for
7	"	"	"	"	Tune for maximum output.	"	A11	Rock tuning cap. and adjust for maximum output.
8	"	"	4MC	"	4MC	"	A12, A13	Adjust for maximum output. Repeat Steps 6, 7 and 8 until no further improvement can be made.
9	"	"	"	Band "C"	"	"	A14	Adjust for maximum output. Check for image by tuning sig. gen. to 4.9MC. If signal is not heard retune sig. gen. to 4MC and adjust for maximum output.
10	"	"	"	"	"	"	A15	Rock tuning cap. and adjust for maximum output.
11	"	"	1.5MC	"	Tune for maximum output. 1.5MC	"	A16, A17	Band spread dial to "0". Adjust A16&A17 for max out. Repeat Steps 9, 10 & 11 until no further improvement can be made.
12	"	"	500KC	Band "D"	500KC	"	A13, A18	Bandspread to "0". Adjust A13 and A18 for maximum output. Return bandspread dial to "Set".
13	"	"	1400KC	"	1400KC	"	A20	Adjust for maximum output. Check for image by tuning sig. gen. to 2.31MC. If signal is not heard, retune sig. gen. to 1400KC and open A20 to next peak. Adjust for maximum output and recheck for image.
14	"	"	"	"	Tune for maximum output.	"	A21	Rock tuning cap. and adjust for maximum output. Repeat Steps 12, 13 and 14 until no further improvement can be made.

DATE 10/48-#4017-14 SET #47-FOLDER #14



STAGE GAIN MEASUREMENTS		
ANTENNA TO CONV. GRID	15X	600KC
CONVERSION GAIN	50X	600KC
		456KC
INPUT IF TRANS.	.9X	456KC
IF TUBE	100X	456KC
OUTPUT IF TRANS.	.6X	456KC
AUDIO	30X	400 ∿
OUTPUT	12X	400 ∿

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	25VAC	115VDC	105VDC	-9.8VDC§	0V.	40VAC	-.2VDC
2	12SG7	0V.	55VAC	1.2VDC	-.1VDC	1.2VDC	110VDC	40VAC	115VDC
# 3	12H6	0V.	14VAC	-.1VDC	-.1VDC	-.2VDC	0V.	25VAC	0V.
† 4	12SL7GT	0V.	50VDC	1VDC	-2.2VDC§	75VDC	0V.	14VAC	0V.
5	35L6GT	0V.	90VAC	110VDC	115VDC	0V.	0V.	55VAC	7.8VDC
6	35Z5GT	0V.	1.7VAC	115VAC	0V.	115VAC	115VDC	90VAC	125VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	INF.	26Ω	70KΩ	71KΩ	22KΩ	0Ω	40Ω	5.1 Meg.
2	12SG7	INF.	56Ω	150Ω	3 Meg.	150Ω	71KΩ	40Ω	70KΩ
# 3	12H6	INF.	14Ω	470KΩ	2.7 Meg.	740KΩ	540KΩ	26Ω	0Ω
† 4	12SL7GT	500KΩ	340KΩ	3.9KΩ	47KΩ	120KΩ	0Ω	14Ω	0Ω
5	35L6GT	INF.	90Ω	70KΩ	70KΩ	470KΩ	0Ω	56Ω	220Ω
6	35Z5GT	0Ω	12Ω	110Ω	0Ω	110Ω	70KΩ	90Ω	7KΩ

#TAKEN WITH "CW-PHONE-ANL" SWITCH IN "ANL" POSITION.
†TAKEN IN CW POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

TRADE NAME	National, Models NC-108R, NC-108T
MANUFACTURER	National Co., Inc. 61 Sherman St., Malden, Mass.
TYPE SET	AC Operated FM Superheterodyne Receiver with Power Supply
TUBES (ELEVEN)	Types, 6BA6 RF Amp., 6AG5 Mixer, 6C4 Osc., 6SG7 1st IF Amp., 6SG7 2nd IF Amp., 6SG7 3rd IF Amp., 6H6 Ratio Det., 6U5/6G5 Tuning Eye, 6SJ7 AF Amp., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-125 Volts AC
TUNING RANGE—FREQ. MOD.	88-108MC RATING .58 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Set monitor switch to "On" and tone control to 10. Use insulated alignment screwdriver for all adjustments.

IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1	Direct	High side to center stator of tuning cap. Low side to chassis.	10.7MC (Unmodulated)	Tuning cap. fully open.	DC probe to Point Ⓐ. Common to chassis.	A1,A2, A3,A4, A5,A6, A7	Attenuate output of sig. gen. to maintain a meter reading of approximately 3 volts. Adjust A1 thru A7 for maximum deflection. Increase output of sig. gen. to obtain meter reading of 10 volts.
2	Direct	"	"	"	DC probe to Point Ⓑ. Common to chassis.	A8	Adjust for meter reading of 5 volts. Reconnect voltmeter to Point Ⓐ. Meter reading at Ⓐ should be twice that of Ⓑ. If not, readjust A7 and A8 in Steps 1 & 2 and recheck voltages. Continue with RF alignment in Step 5.

IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
1	.01 MFD	High side to Pin 4 (grid) of 6SG7 2nd IF Tube (5). Low side to chassis.	10.7MC (Freq. modulated)	Tuning cap. fully open.	Vertical input to Point Ⓐ. Ground to chassis.	A1,A2, A3	Disconnect 10 MFD cap. (14) from Point Ⓐ. Adjust A1, A2, A3 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
2	.01 MFD	High side to Pin 4 (grid) of 6SG7 1st IF Tube (4). Low side to chassis.	"	"	"	A4,A5	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
3	.01 MFD	High side to center stator of tuning cap. Low side to chassis.	"	"	"	A6,A7	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1. Reconnect 10 MFD cap. (14) to Point Ⓐ.
4	.01 MFD	High side to Pin 4 (grid) of 6SG7 2nd IF Tube (5). Low side to chassis.	"	"	Vertical input to Point Ⓑ. Ground to chassis.	A8	Adjust A8 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Cont. with RF Alignment, Step 5.

RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
5	300Ω carbon res.	High side to either ant. terminal. Low side to other terminal. (Link disconnected)	108MC (Unmodulated)	108MC		A9	Adjust for maximum indication on tuning indicator.
6	"	"	"	Tune for maximum indication.		A10,A11	"

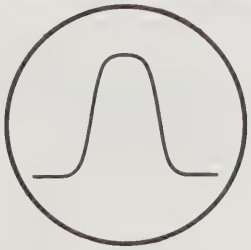


FIG. 1

FIG. 2

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		NATIONAL PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6AG5	6AG5	7BD	
2	Mixer	6AG5	6AG5	7BD	
3	Osc.	6C4	6C4	6BG	
4	1st IF Amp.	6SG7	6SG7	6BK	
5	2nd IF Amp.	6SG7	6SG7	6BK	
6	3rd IF Amp.	6SG7	6SG7	6BK	
7	Ratio Det.	6H6	6H6	7Q	
8	Tuning Eye	6U5/6G5	6U5/6G5	6R	Used on NC-108T only
9	AF Amp.	6SJ7	6SJ7	6N	
10	Power Output	6V6GT	6V6GT	7AC	
11	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

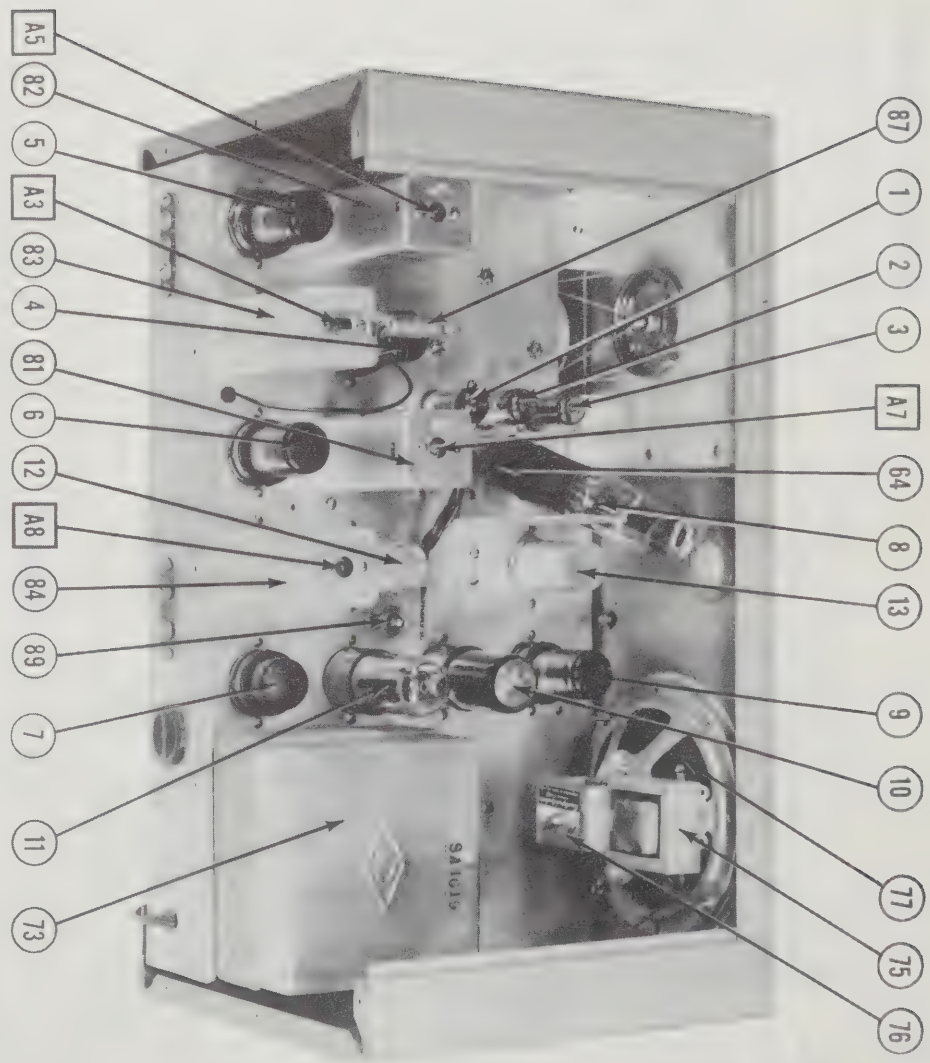
Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	NATIONAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
12A	10	450		AF22J	UP1145	DY-2x10-450	EL-210	Filter
B	10	450						"
13A	25	50		AF44D	UP1045	DY-10-450/25-50		▲ Cathode Bypass
B	8	450						■ Decoupling
C	25	50		PRS-450/8	BRD2215	M-25-50		Cathode Bypass
14	10	50		PRS50/10	BR105	M-25-50	TA-510	Stabalizing Cap.
15	.01	400		484-01	DT4S1	MPH-6-01	TC-11	Line Filter
16	.005	500		684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
17	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
18	.1	400		484-.1	DT4P1	ST-4-1	TC-1	1st Audio Screen Byp.
19	.01	400		484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
20	.01	400		484-01	DT4S1	ST-4-01	TC-11	3rd IF Screen Bypass
21	.01	400		484-01	DT4S1	ST-4-01	TC-11	3rd Plate Decoupling
22	.01	400		484-01	DT4S1	ST-4-01	TC-11	RF Bypass Pwr. Supply
23	.01	400		484-01	DT4S1	ST-4-01	TC-11	3rd IF Cathode Bypass
24	.01	400		484-01	DT4S1	ST-4-01	TC-11	2nd IF Plate Decoupling
25	.01	400		484-01	DT4S1	ST-4-01	TC-11	2nd IF Screen Bypass
26	.01	400		484-01	DT4S1	ST-4-01	TC-11	AVC Filter
27	.01	400		484-01	DT4S1	ST-4-01	TC-11	1st IF Plate Decoup.
28	.01	400		484-01	DT4S1	ST-4-01	TC-11	1st IF Screen Bypass
29	.01	400		484-01	DT4S1	ST-4-01	TC-11	AVC Filter
30	.01	400		484-01	DT4S1	ST-4-01	TC-11	Mixer Plate Decoupling
31	1000	500		1467-001	1W5D1	MW.5-21	1FM-21	RF Bypass-Cer.
32	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Mixer Screen Bypass-Cer.
33	1000	500		1467-001	1W5D1	MW.5-21	1FM-21	Mixer Cathode Bypass-Cer.
34	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	RF Coupling-Cer.
35	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	RF Screen Bypass-Cer.
36	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	RF Coupling-Cer.
37	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.-Cer.
38	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Plate Decoupling-Cer.
39	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	Fil. Bypass-Cer.
40	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	" " "
41	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	De-emphasis-Cer.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	CLAROSTAT PART No.	
42A	500KΩ	½		D13-133	M-60-Z	Volume Control
B	Shaft			A	Not Req.	Attach to 42A per instructions
43A	500KΩ	½		D13-133	M-60-Z	Tone Control
B	Shaft			A	Not Req.	Attach to 43A per instructions
C	Switch			42	SW-A2	" " " " "

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	NATIONAL PART No.	IRC PART No.	
44	100KΩ	½		BTS-100K	Br.-Blk.-Yl. RF Grid
45	47KΩ	½		BTS-47K	Yl.-Vi.-Or. RF Screen
46	35KΩ	1		BTA-33K	Or.-Grn.-Or. Osc. Plate Decoupling
47	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Osc. Grid
48	2200Ω	½		BTS-2200	Red-Red-Red Mixer Cathode
49	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Mixer Screen
50	2200Ω	½		BTS-2200	Red-Red-Red Mixer Plate Decoup.
51	220KΩ	½		BTS-220K	Red-Red-Yl. AVC Network
52	33KΩ	½		BTS-33K	Or.-Or.-Or. 1st IF Screen
53	2200Ω	½		BTS-2200	Red-Red-Red 1st IF Plate Decoupling
54	220KΩ	½		BTS-220K	Red-Red-Yl. AVC Network
55	33KΩ	½		BTS-33K	Or.-Or.-Or. 2nd IF Screen
56	2200Ω	½		BTS-2200	Red-Red-Red 2nd IF Plate Decoup.
57	100Ω	½			Br.-Blk.-Br. 3rd IF Cathode
58	33KΩ	½		BTS-33K	Or.-Or.-Or. 3rd IF Screen
59	4700Ω	½		BTS-4700	Yl.-Vi.-Red 3rd IF Plate Decoup.
60	15KΩ	½		BTS-15K	Br.-Grn.-Or. Ratio Det. Load
61	4700Ω	½		BTS-4700	Yl.-Vi.-Red Radio Det. Load-See Note 2
62	33KΩ	½		BTS-33K	Or.-Or.-Or. De-emphasis
63	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AVC Network
64	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Eye Plate Load-See Note 1
65	8200Ω	½		BTS-8200	Gray-Red-Red Series Tuning Ind. -See Note 3
66	2200Ω	½		BTS-2200	Red-Red-Red AF Cathode
67	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AF Screen
68	220KΩ	½		BTS-220K	Red-Red-Yl. AF Plate Load
69	22KΩ	½		BTS-22K	Red-Red-Or. AF Decoup.
70	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
71	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Tone Compensation
72	330Ω	2		BW-2-330	Or.-Or.-Br. Output Cathode

Note 1-Used on Model NC-108T only.
Note 2-Used on Model NC-108T only. Model NC-108R uses 10,000Ω ½ W. in this application.
Note 3-Used on Model NC-108R only.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	NATIONAL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
73	117V AC @ .58A	520V CT @ .082ADC	5.0V AC @ 2.0A	6.6V AC @ 3.1A		P-8494#	T22R04#	P-2502#

#Drill new mounting holes and add series resistor to reduce plate voltage.

FILTER CHOKE

ITEM NO.	RATINGS			REPLACEMENT DATA				INSTALLATION NOTES
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE @ CURRENT 1000 Ω	NATIONAL PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	
74	.08A	265Ω	3 Henries	K317	C-1709	T20053	C-2990	↑ Drill new mtg. hole

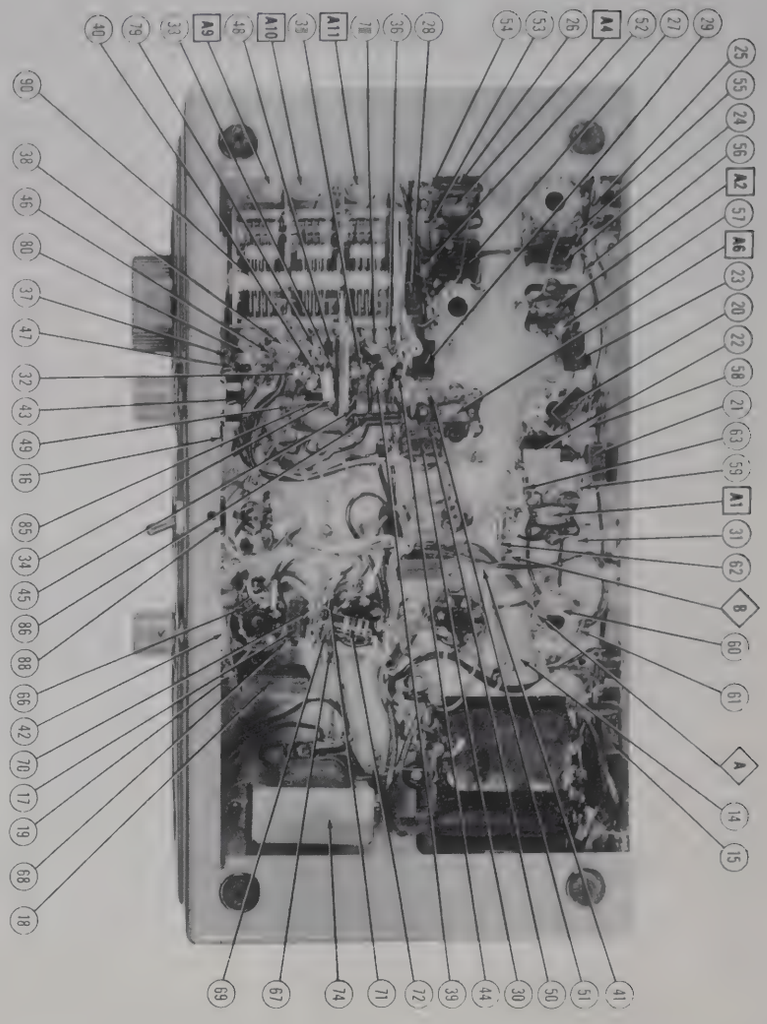
TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		NATIONAL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
75	4300Ω	3.2Ω	174Ω	.3Ω		A-3850	T22S46	A-2030	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	NATIONAL PART No.	JENSEN PART No.	QUAM PART No.	
76	PM	3.2Ω		ST-107 Mod. P5-V	5A15	
	CONE DIA.	VC Dia.				
77	4-5/8"	9/16"				

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

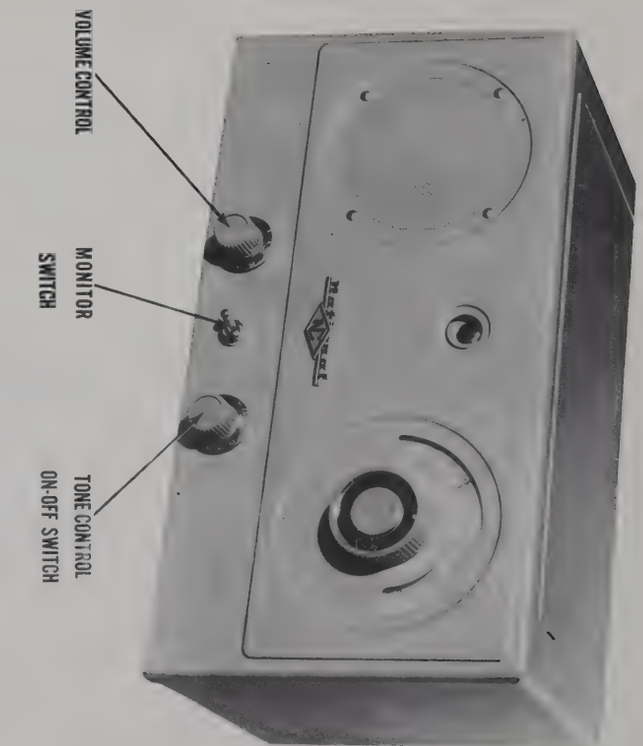
ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	NATIONAL PART No.	MEISSNER PART No.	
78	Ant. Coil	0Ω	0Ω			
79	RF Coil		0Ω			
80	Osc. Coil		0Ω			
81	1st IF	.1Ω	.1Ω			
82	2nd IF	.1Ω	.1Ω			
83	3rd IF	.1Ω	.1Ω			
84	Det. Trans.	.2Ω	.1Ω			
85	RF Plate Choke		.2Ω			
86	B+ Choke		.2Ω			

DIAL LIGHT

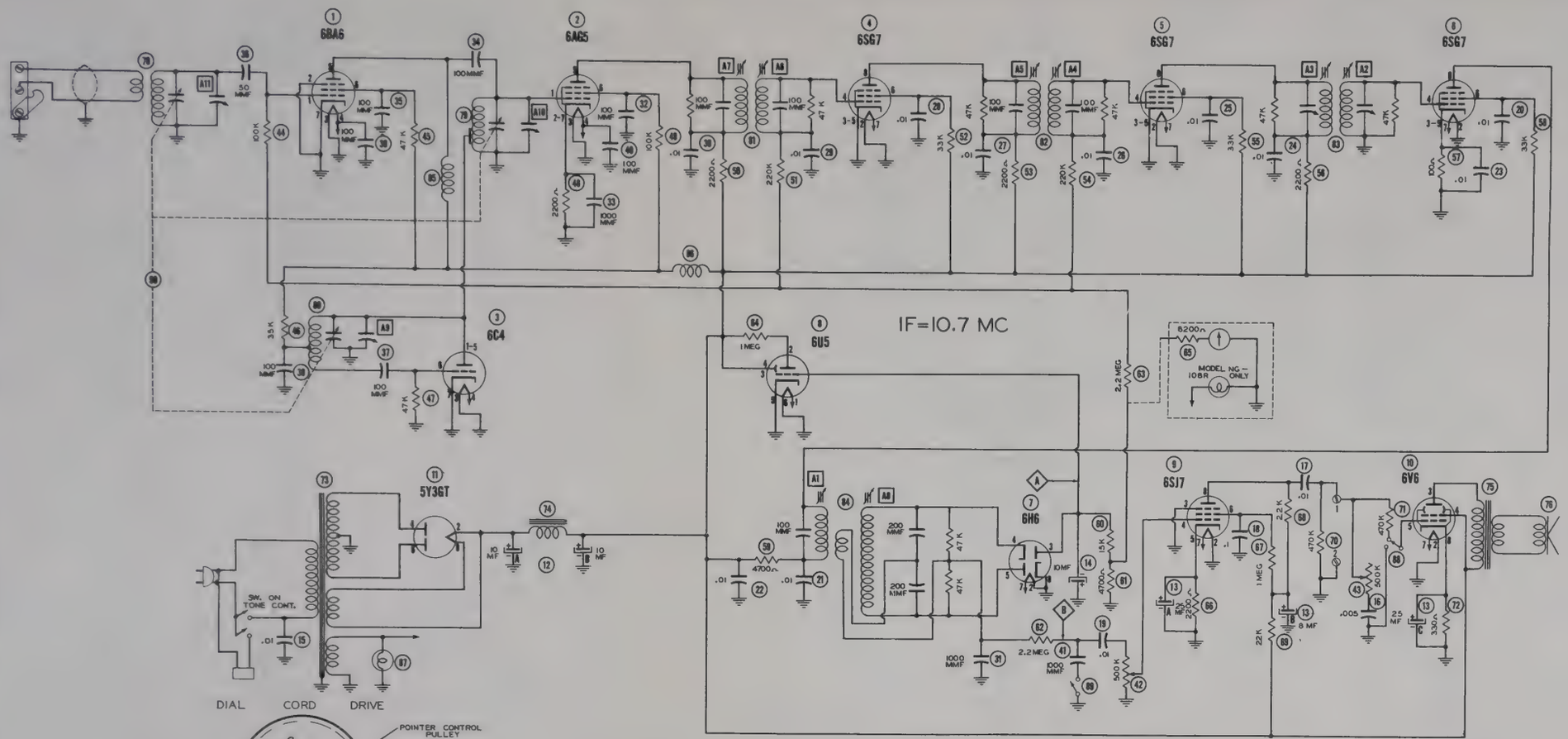
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					NATIONAL PART No.		
87	Bayonet	6-8	0.15	Brown			Type 47

MISCELLANEOUS

ITEM No.	PART NAME	NATIONAL PART No.	NOTES
88	Switch		Monitering
89	"		De-emphasis
90	3 Gang Var. Cap.		



NATIONAL MODEL NC-108T



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	-.1VDC	0V.	0V.	6.6VAC	205VDC	70VDC	0V.	-
2	6AG5	0V.	4VDC	0V.	6.6VAC	200VDC	170VDC	4VDC	-
3	6C4	60VDC	215VDC	0V.	6.6VAC	60VDC	-5.6VDC§	0V.	-
4	6SG7	0V.	0V.	0V.	-.7VDC	0V.	115VDC	6.6VAC	200VDC
5	6SG7	0V.	0V.	0V.	-.7VDC	0V.	115VDC	6.6VAC	200VDC
6	6SG7	0V.	0V.	11VDC	0V.	11VDC	115VDC	6.6VAC	160VDC
7	6H6	0V.	0V.	-1VDC	-2VDC	-.3VDC	-.3VDC	6.6VAC	0V.
8	6U5/6G5	-	-	-	-	-	-	-	-
9	6SJ7	0V.	0V.	0V.	0V.	1.8VDC	35VDC	6.6VAC	75VDC
10	6V6GT	0V.	0V.	215VDC	205VDC	0V.	0V.	6.6VAC	11VDC
11	5Y3GT	0V.	227VDC	0V.	260VAC	0V.	260VAC	0V.	227VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

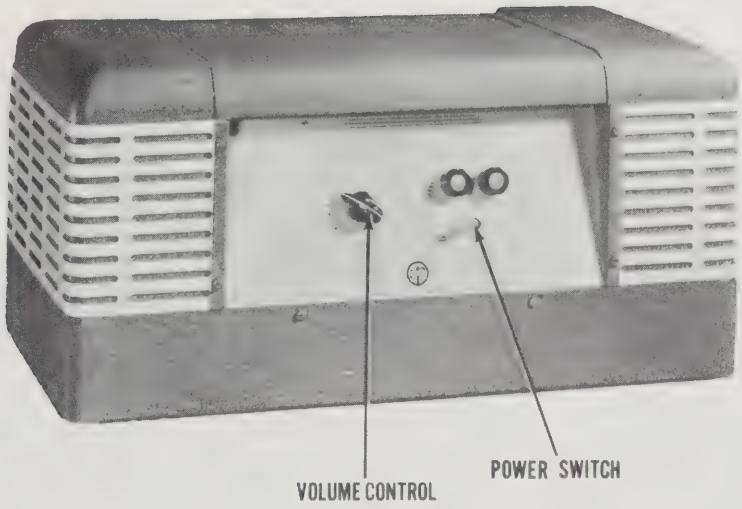
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6BA6	2.5 Meg.	0Ω	0Ω	.1Ω	70KΩ	120KΩ	0Ω	-
2	6AG5	0Ω	2.2KΩ	0Ω	.1Ω	72KΩ	170KΩ	2.2KΩ	-
3	6C4	110KΩ	70KΩ	0Ω	.1Ω	110KΩ	47KΩ	0Ω	-
4	6SG7	0Ω	0Ω	0Ω	2.5 Meg.	0Ω	100KΩ	.1Ω	72KΩ
5	6SG7	0Ω	0Ω	0Ω	2.5 Meg.	0Ω	100KΩ	.1Ω	72KΩ
6	6SG7	0Ω	0Ω	100Ω	.1Ω	100Ω	100KΩ	.1Ω	75KΩ
7	6H6	0Ω	0Ω	20KΩ	INF.	INF.	4.7KΩ	.1Ω	0Ω
8	6U5/6G5	-	-	-	-	-	-	-	-
9	6SJ7	0Ω	0Ω	0Ω	500KΩ	2.2KΩ	1.1 Meg.	.1Ω	300KΩ
10	6V6GT	0Ω	0Ω	70KΩ	70KΩ	940KΩ	INF.	.1Ω	330Ω
11	5Y3GT	INF.	70KΩ	INF.	105Ω	INF.	100Ω	INF.	70KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948



OPERADIO
MODEL 1A70-A

OPERADIO
MODEL 1A70-A

OPERADIO MODEL 1A70-A

TRADE NAME	Operadio, Model 1A70-A
MANUFACTURER	Operadio Mfg. Co., St. Charles, Ill.
TYPE SET	AC Operated Audio Booster Amplifier with Power Supply
TUBES (EIGHT)	Types, 6J5 Mic. Amp., 6SN7GT AF-Phase Inv. (4) 6L6G Power Output, (2) 5U4G Rectifier.
POWER SUPPLY	110-120 Volts AC RATING 2 Amps. @ 117 Volts AC

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6J5	0V.	3.2VAC	175VDC	0V.	0V.	0V.	3.2VAC	7.0VDC
2	6SN7GT	0V.	110VDC	3.6VDC	0V.	80VDC	2.2VDC	3.2VAC	3.2VAC
3	6L6G	0V.	3.2VAC	400VDC	320VDC	0V.	0V.	3.2VAC	26VDC
4	6L6G	0V.	3.2VAC	400VDC	320VDC	0V.	0V.	3.2VAC	26VDC
5	6L6G	0V.	3.2VAC	400VDC	320VDC	0V.	0V.	3.2VAC	26VDC
6	6L6G	0V.	3.2VAC	400VDC	320VDC	0V.	0V.	3.2VAC	26VDC
7	5U4G	0V.	420VDC	0V.	390VAC	0V.	390VAC	0V.	420VDC
8	5U4G	0V.	420VDC	0V.	390VAC	0V.	390VAC	0V.	420VDC

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6J5	0Ω	.05Ω	50KΩ	INF.	32KΩ	INF.	.05Ω	2.7KΩ
2	6SN7GT	6.8KΩ	70KΩ	1KΩ	68KΩ	70KΩ	640Ω	.05Ω	.05Ω
3	6L6G	0Ω	.05Ω	7KΩ	8.2KΩ	65KΩ	INF.	.05Ω	85Ω
4	6L6G	0Ω	.05Ω	7KΩ	8.2KΩ	65KΩ	INF.	.05Ω	85Ω
5	6L6G	0Ω	.05Ω	7KΩ	8.2KΩ	56KΩ	INF.	.05Ω	85Ω
6	6L6G	0Ω	.05Ω	7KΩ	8.2KΩ	56KΩ	INF.	.05Ω	85Ω
7	5U4G	INF.	7KΩ	INF.	19Ω	INF.	21Ω	INF.	7KΩ
8	5U4G	INF.	7KΩ	INF.	19Ω	INF.	21Ω	INF.	7KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at minimum, proper output load connected.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 10/47-#4817-16 SET #47-FOLDER #16

PARTS LIST AND DESCRIPTIONS

OPERADIO MODEL 1A70-A

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: OPERADIO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Mic. Amp.	6J5	6J5	6Q	
2	AF-Phase Inv.	6SN7GT	6SN7GT	8BD	
3	Power Output	6L6G	6L6G	7AC	
4	" "	6L6G	6L6G	7AC	
5	" "	6L6G	6L6G	7AC	
6	" "	6L6G	6L6G	7AC	
7	Rectifier	5U4G	5U4G	5T	
8	"	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: OPERADIO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
9A	20	500	199-2914	AF44J#	UP2250	DY-4x10-450*	EL-220#	● Filter
B	20	500						■ "
10A	10	400	199-2904	AF222J*	UP6CJ20	DY-3x10-450*	EL-360	▲ "
B	20	450		PRS350/4		M-4-450		■ Decoupling
C	5	350						"
11	20	150	199-2016-206	PRS150/20	BR2015	M-20-150	UT201	Output Cathode Bypass
12	25	25		PRS25/25	BR252A	M-25-25	TA-25	AF Cathode Bypass
13	.006	600	199-4030-602	684-006	DT6D6	ST-6-006	TC-26	Line Filter
14	.002	1200	199-5041-202	1684-002	MD16D2	STM-16-002	TR-22	Tone Comp.
15	.002	1200	199-5041-202	1684-002	MD16D2	STM-16-002	TR-22	" "
16	.5	400	199-4022-504	484-.5	DT4P5	ST-4-5	TC-5	Audio Coupling
17	.5	400	199-4022-504	484-.5	DT4P5	ST-4-5	TC-5	" "
18	.05	400	199-4021-503	484-05	DT4S5	ST-4-05	TC-15	" "
19	.05	400	199-4021-503	484-05	DT4S5	ST-4-05	TC-15	" "

*Parallel sections to obtain desired capacity.
#Use mounting plate supplied by manufacturer.

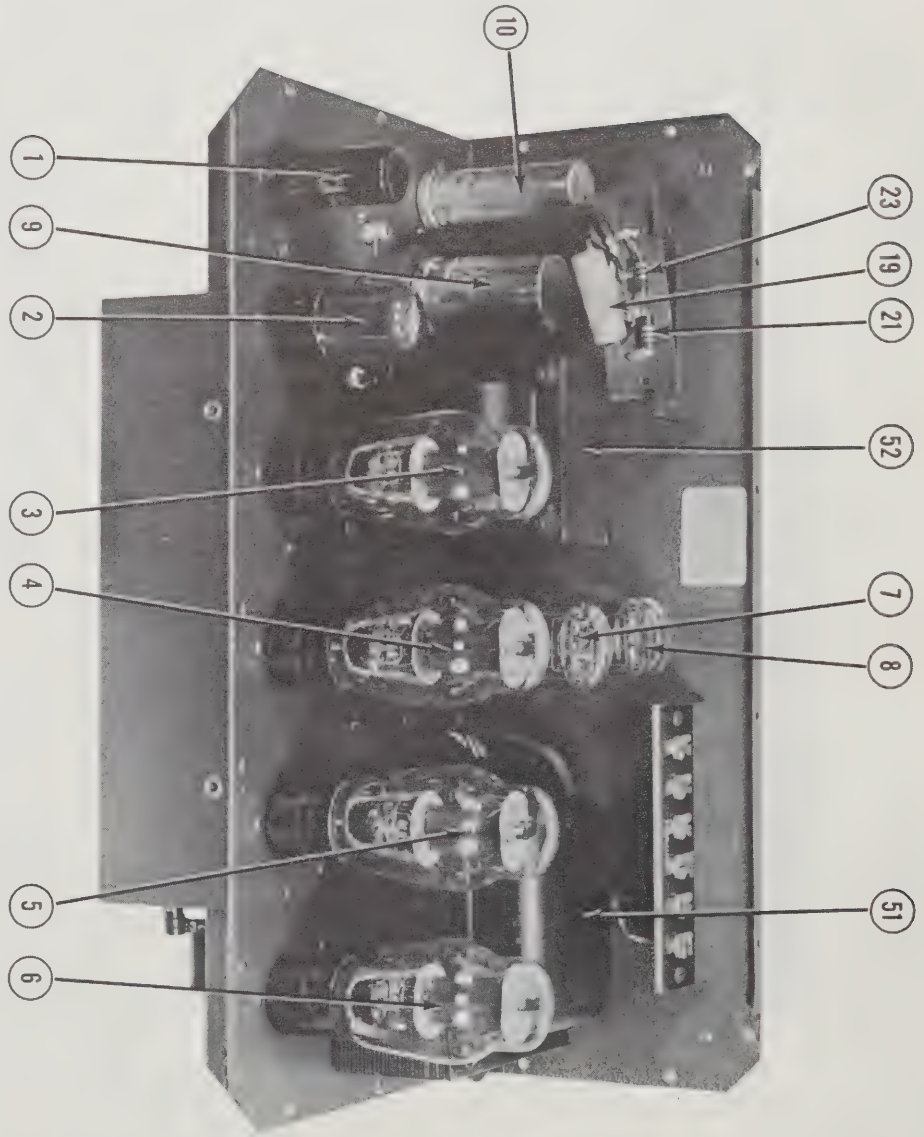
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OPERADIO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
20A	500KΩ	½	601-3289	D1S-133	M-50-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 20A per instructions

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: OPERADIO PART No.	IRC PART No.	IDENTIFICATION CODES
21	56KΩ	1	600-0116-563	BTA-56K	Grn.-Blue-Or. Input Impedance Matching
22	27KΩ	1	600-0116-273	BTA-27K	Red-Vi.-Or. 1st AF Grid
23	5600Ω	1	600-0116-562	BTA-5600	Grn.-Blue-Red 1st AF Grid
24	2700Ω	1	600-0116-272	BTA-2700	Red-Vi.-Red 1st AF Cathode
25	27KΩ	1	600-0116-273	BTA-27K	Red-Vi.-Or. 1st AF Plate Load
26	10KΩ	1	600-0116-103	BTA-10K	Br.-Blk.-Or. Decoupling
27	68KΩ	½	600-0043-683	BTS-68K	Blue-Gray-Or. Tone Compensation
28	560Ω	1	600-0116-561	BTA-560	Grn.-Blue-Br. 2nd AF Cathode
29	56KΩ	2	600-0016-563	BT-2-56K	Grn.-Blue-Or. 2nd AF Plate Load
30	6800Ω	1	600-0016-682	BTA-6800	Blue-Gray-Red Phase Inv. Grid
31	1000Ω	1	600-0016-102	BTA-1000	Br.-Blk.-Red Phase Inv. Cathode
32	56KΩ	2	600-0153-563	BT-2-56K	Grn.-Blue-Or. Phase Inv. Plate Load
33	56KΩ	1	600-0116-563	BTA-56K	Grn.-Blue-Or. Output Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	OPERADIO PART No.	IRC PART No.	
34	56KΩ	1	600-0116-563	BTA-56K	Grn.-Blue-Or. " "
35	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. Parasitic Supp.
36	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. " "
37	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. " "
38	56Ω	1	600-1004-560	BW-1-56	Grn.-Blue-Blk. " "
39	50Ω	5	600-1008-500	AB-50	" "
40	50Ω	5	600-1008-500	AB-50	" "
41	50Ω	5	600-1008-500	AB-50	" "
42	50Ω	5	600-1008-500	AB-50	" "
43	85Ω	25	600-9015	DHA-100	Output Cathode-See Note 1
44	5000Ω	10	600-1011-502	AB-5000	Tone Comp.
45	5000Ω	10	600-1011-502	AB-5000	" "
46	1200Ω	25	600-9008	DHA-1250	Filter-See Note 2
47	5000Ω	25	600-1018-502	DHA-5000	Cathode Dropping
48	4700Ω	1	600-0116-472	BTA-4700	Yl.-Vi.-Red Decoup.
49	1000Ω	1	600-0116-102	BTA-1000	Br.-Blk.-Red Feedback
50	82Ω	1	600-0015	BW-1-82	Gray-Red-Blk. "

Note 1-On IRC replacement set slider 85Ω from end.
Note 2-On IRC replacement set slider 1200Ω from end.

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	OPERADIO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
51	117V AC @ 2.0A	780V CT .3A DC	5.2V AC @ 5.5A	6.4V CT @ 4.6A	710-4031-02		T22R35†	

†Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		OPERADIO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
52	4000Ω CT	500Ω tapped 70V SEC. 2 2.5 VCT	175Ω CT	34Ω tapped @ 7Ω SEC.2 .5Ω CT	710-2020				

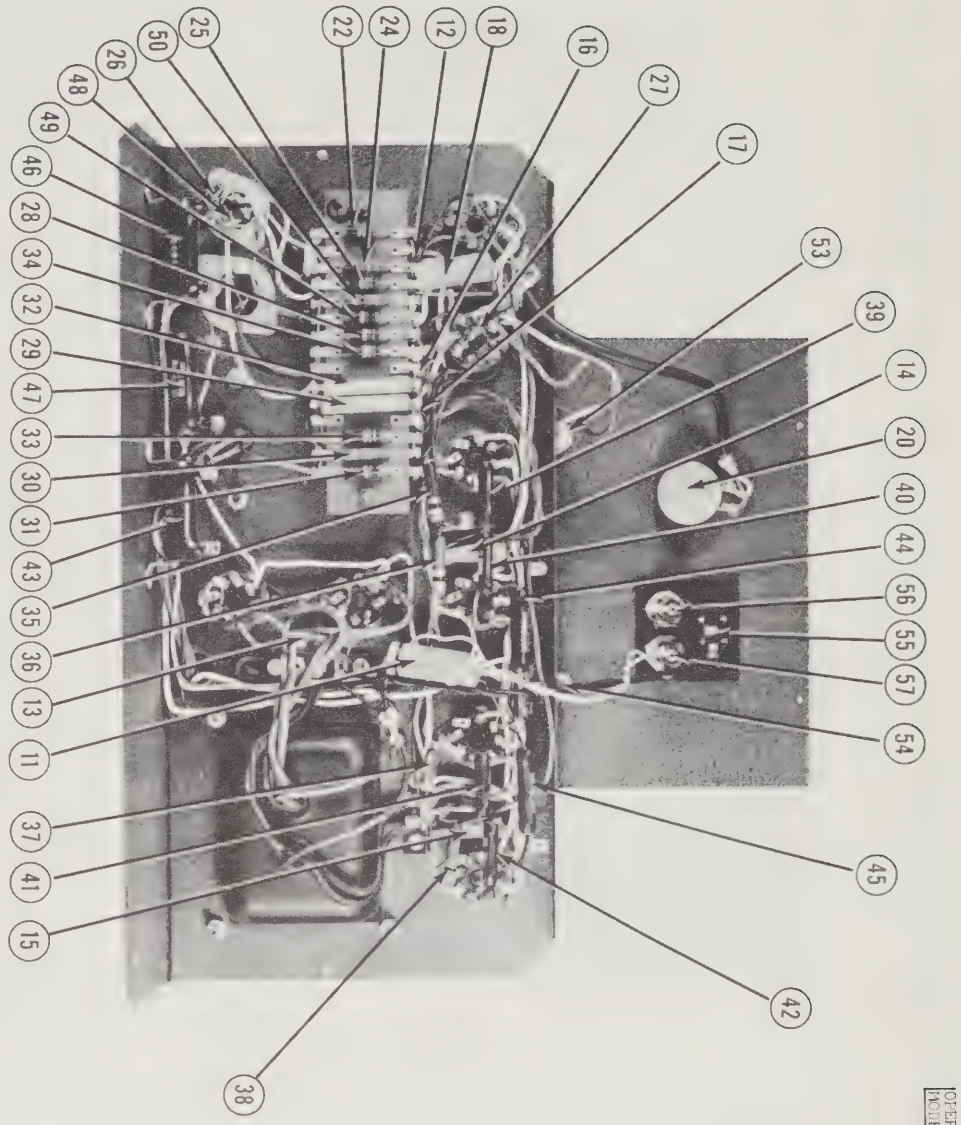
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					OPERADIO PART No.		
53	Bayonet	6-8	0.25	Blue	456-8496		Type #44
54	"	6-8	0.25	"	456-8496		" "

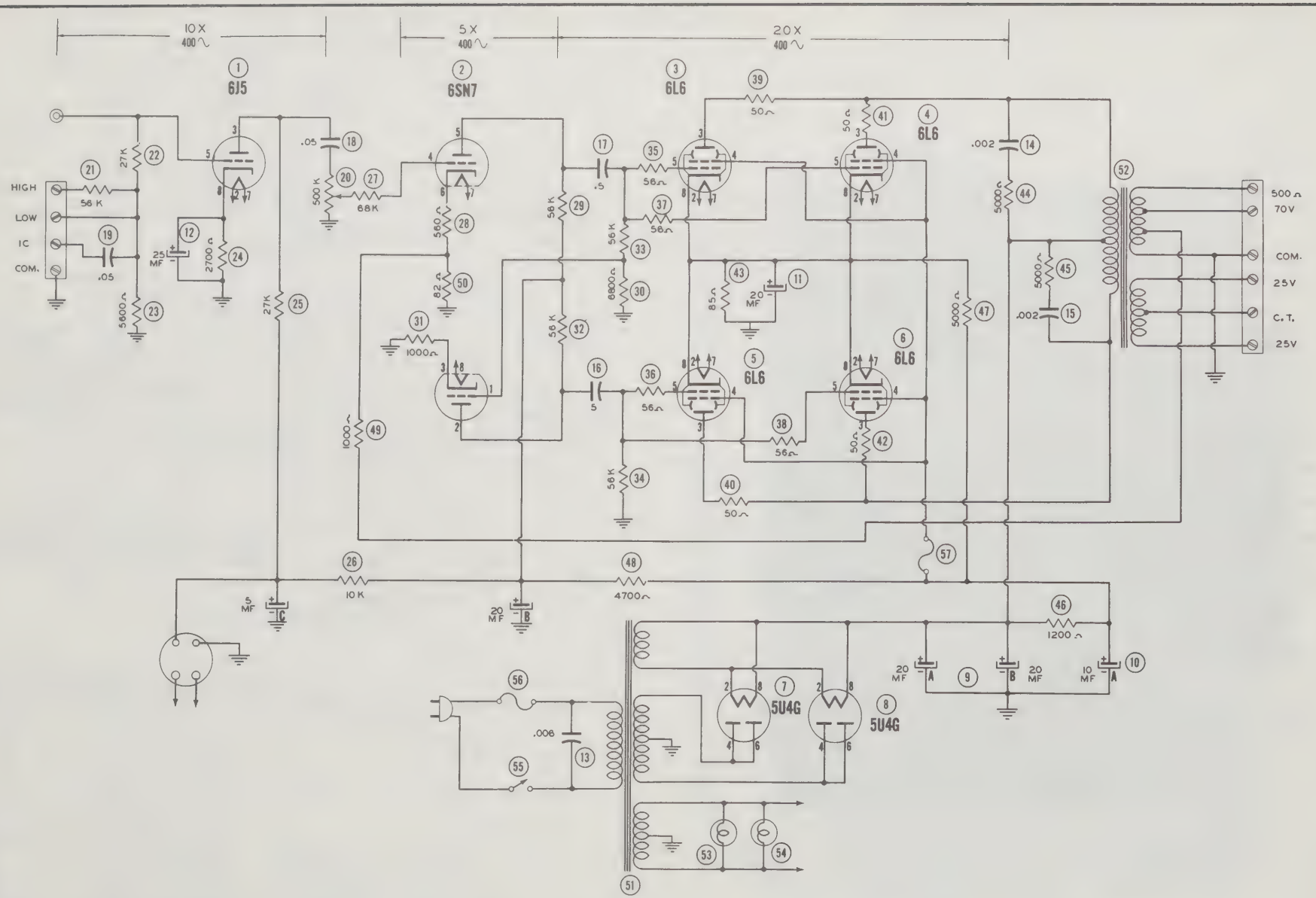
MISCELLANEOUS

ITEM No.	PART NAME	OPERADIO PART No.	NOTES
55	Switch	680-8	On-Off (Power)
56	Fuse	320-835-0300	Power 3AG 3 Amp.
57	"	320-835-0018	Screen 3AG .18 Amp.

CHASSIS—BOTTOM VIEW

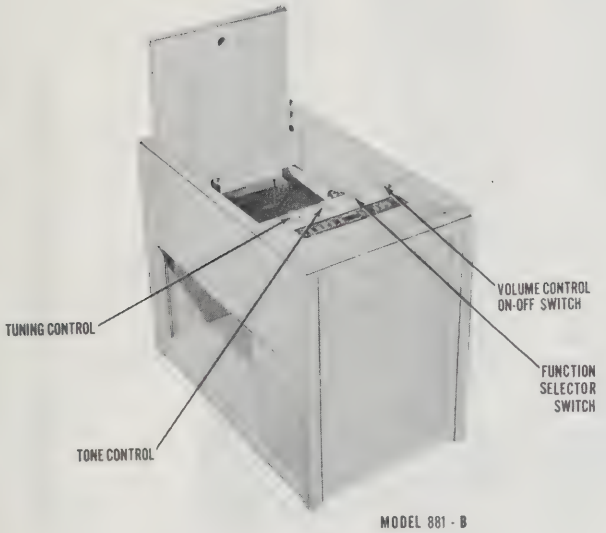


DATE 10/17-#4817-16- SET #17-FOLDER #16
OPERADIO MODEL 1A70-A
OPERADIO MODEL 1A70-A

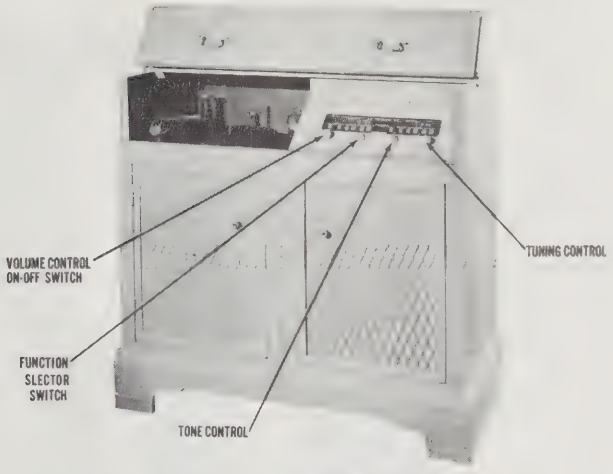

10X
400
5X
400
20X
400
1
6J5
2
6SN7
3
6L6
4
6L6
5
6L6
6
6L6
7
5U4G
8
5U4G
HIGH
LOW
IC
COM.
56 K
.05
27K
5600Ω
25 MF
2700Ω
.05
500 K
68K
580Ω
82Ω
27K
56 K
1000Ω
56 K
.5
56K
6800Ω
56K
5
56K
56Ω
56Ω
56Ω
50Ω
50Ω
50Ω
85Ω
20 MF
1000Ω
5000Ω
.002
5000Ω
.002
5000Ω
500Ω
70V
COM.
25V
C.T.
25V
10 K
4700Ω
1200Ω
5 MF
C
20 MF
B
20 MF
A
20 MF
B
10 MF
A
.006
A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1948
4817-16

PACKARD-BELL MODELS 881-A, 881-B

PACKARD-BELL MODELS 881-A, 881-B



MODEL 881 - B



MODEL 881-A

TRADE NAME	Packard-Bell, Models 881A, 881B
MANUFACTURER	Packard-Bell Co., 3443 Wilshire Blvd., Los Angeles, Calif.
TYPE SET	AC Operated Combination Phono-Recorder-Radio, Superheterodyne Receiver
TUBES (EIGHT)	Types, 6SK7 RF Amp., 6SA7 Converter, 6SK7 IF Amp., 6H6 Det.-AVC-Comp. Rect., 6SQ7GT Mic. Amp., 6SF7 AF Amp., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	540-1620KC RATING .45 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to Pin 8 (grid) of 6SA7. Low side to chassis.	455KC	Tuning cap. fully closed.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output. Replace receiver in cabinet.
2		Loop	1620KC	Tuning cap. fully open.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	600KC	Tune for maximum output.	"	A6	Rock tuning cap. and adjust for maximum output.
4		"	1500KC	"	"	A7,A8	Adjust for maximum output. Repeat Steps 2, 3,& 4 until no further improvement can be made.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Tilt cabinet over on its back.
3. By reaching through opening in bottom of cabinet remove loop antenna plug from chassis.
4. Remove phono-pickup, phono-motor and speaker plugs from chassis.
5. Remove five Phillips head wood screws holding loop antenna panel in cabinet. Remove loop antenna panel from cabinet.
6. Remove four Phillips head wood screws holding speaker in cabinet. Remove speaker from cabinet.
7. Remove one machine screw from front of record changer compartment holding chassis in cabinet. Remove two remaining machine screws from rear of chassis. Remove chassis from cabinet.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		PACKARD-BELL PART No.	STANDARD REPLACEMENT		
1	RF Amp.	6SK7	6SK7	8N	
2	Converter	6SA7	6SA7	8R	
3	IF Amp.	6SK7	6SK7	8N	
4	Det.-AVC-Comp. Rect.	6H6	6H6	7Q	
5	Mic. Amp.	6SQ7GT	6SQ7GT	8Q	
6	AF Amp.	6SF7	6SF7	7AZ	
7	Power Output	6V6GT	6V6GT	7AC	
8	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

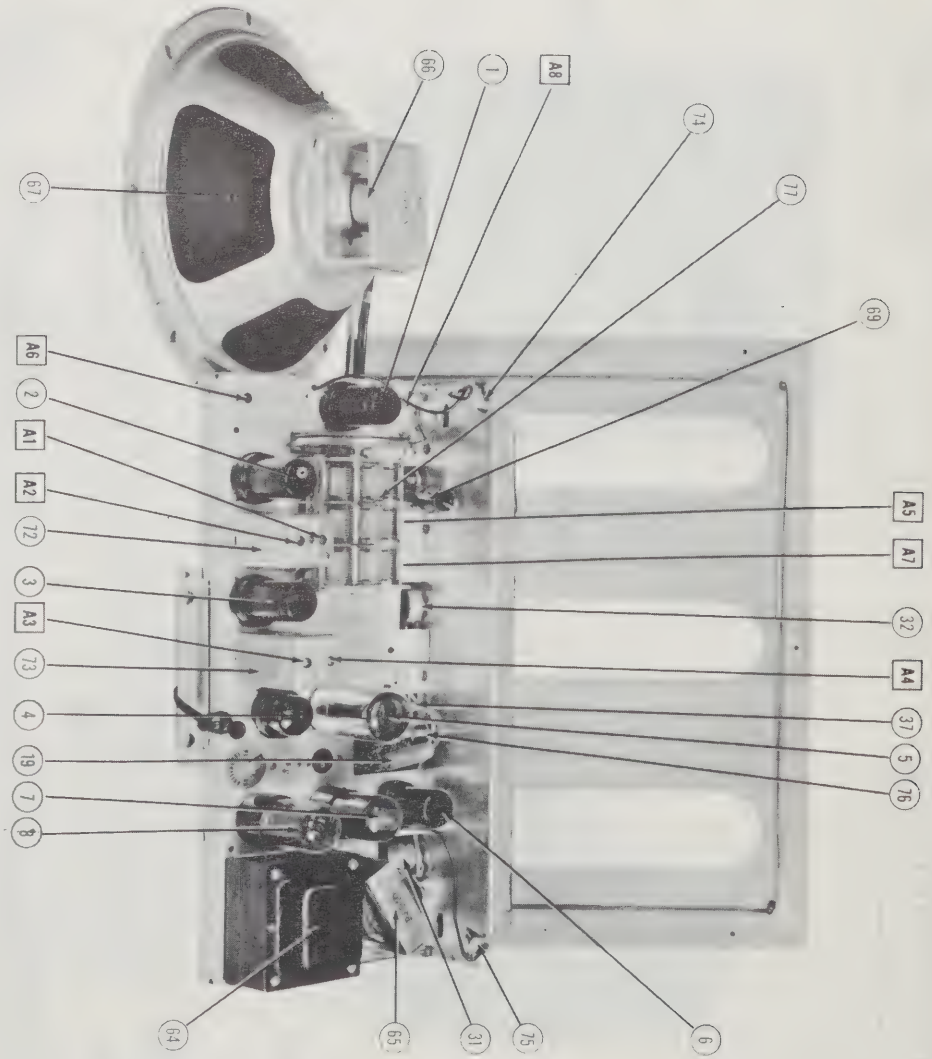
ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	PACKARD-BELL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
9	40	350	24004A	PRS450-40	BR4045	M-40-350	UT-30	Filter
10	20	350	24003	PRS350-24	BR2045	M-20-350	UT-203	"
11	.005	600	23004	684-005	DT6D5	ST-6-005	TC-25	Output Plate Bypass
12	.01	500	23006	684-01	DT6S1	ST-6-01	TC-11	Compression Coupling
13	.02	600	23007	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
14	.001	600	23001	684-001	DT6D1	ST-6-001	TC-21	Tone Comp.
15	.05	400	23009	484-05	DT4S5	ST-4-05	TC-15	Bias Filter
16	.2	+00	23020	484-.2	DT4P2	ST-4-2	TC-2	AF Plate Decoupling
17	.2	400	23020	484-.2	DT4P2	ST-4-2	TC-2	AF Screen Bypass
18	.1	400		484-.1	DT4P1	ST-4-1	TC-1	AF Screen Decoup.-Note 1
19	.005	600	23004	684-005	DT6D5	ST-6-005	TC-25	Audio Coupling
20	.1	200	23019	484-.1	DT2P1	ST-4-1	TC-1	Compression Filter
21	.02	600	23007	684-02	DT6S2	ST-6-02	TC-12	Audio Coupling
22	.05	400	23009	484-05	DT4S5	ST-4-05	TC-15	Screen Decoupling
23	.05	400	23009	484-05	DT4S5	ST-4-05	TC-15	RF Bypass Pwr. Supply
24	.05	200		484-05	DT2S5	ST-4-05	TC-15	AVC Filter
25	470	500		1468-0005	5W5T5	MO.5-35	1FM-35	Tone Comp.-See Note 1
26A	30	500		1468-000025	5W5Q25	MO.5-425	1FM-425	Diode RF Filter-Cer-Note 2
B	30	500		1468-000025	5W5Q25	MO.5-425	1FM-425	" " " " " "
27	51	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
28	51	300		1469-00005	5R5Q5	MOS.5-45	MS-45	Fixed Trimmer-Cer.
29	220	500	23015	1468-0002	5W5T2	MO.5-32	1FM-32	RF Coupling-Cer.
30	220	300	23015	1468-0002	5W5T2	MO.5-32	1FM-32	" " "

Note 1-Not used in all models.
Note 2-Items 26A & 26B and 41 are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	PACKARD-B. PART No.	IRC PART No.	CLAROSTAT PART No.	
31A	1 Meg.	½	25010B	D13-137X	T-109	Volume Control tapped @ 200KΩ
B	Shaft		Not Req.	A	Not Req.	Attach to 31A per instructions
C	Switch		" "	41	SW-A	" " " " "
32A	5 Meg.	½	25506C	D11-141	M-69-Z	Tone Control
B	Shaft		Not Req.	A	Not Req.	Attach to 32A per instructions

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PACKARD-BELL PART No.	REPLACEMENT DATA IRC PART No.	IDENTIFICATION CODES
33	2.2 Meg.	½	73055	BTS-2.2 Meg.	Red-Red-Grn. RF Grid
34	39K	½		BW-½-39	Or.-White-Blk. RF Cathode
35	2.2 Meg.	½	73055	BTS-2.2 Meg.	Red-Red-Grn. Conv. Grid
36	22K	½		BTS-22K	Red-Red-Or. Osc. Grid
37	390Ω	½		BW-½-390	Or.-White-Br. IF Cathode
38	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
39	220K	½		BTS-220K	Red-Red-Yl. Diode Load
40	22K	½		BTS-22K	Red-Red-Or. " "
41	47K	½		BTS-47K	Diode Filter-See Note 1
42	470K	½		BTS-470K	Yl.-Vl.-Yl. Compression Bias Network
43	470K	½		BTS-470K	Yl.-Vl.-Yl. " " "
44	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vl.-Grn. Compression Filter
45	220K	½		BTS-220K	Red-Red-Yl. Compression Diode Load
46	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vl.-Grn. Mic. Amp. Grid
47	100K	½		BTS-100K	Br.-Blk.-Yl. Mic. Amp. Plate Load
48	680K	½	73052	BTS-680K	Blue-Gray-Yl. Feedback
49	4.7 Meg.	½		BTS-4.7 Meg.	Yl.-Vl.-Grn. AF Grid
50	220K	½		BTS-220K	Red-Red-Yl. AF Plate Load
51	390Ω	½		BW-½-390	Or.-White-Blk. AF Cathode
52	47KΩ	½		BTS-47K	Yl.-Vl.-Or. AF Screen
53	1.5 Meg.	½	73054	BTS-1.5 Meg.	Br.-Grn.-Grn. AF Screen Decoupling
54	47KΩ	½		BTS-47K	Yl.-Vl.-Or. AF Plate Decoupling
55	560Ω	½	73022	BTS-560	Grn.-Blue-Br. Feedback
56	10KΩ	2		BT-2-10K	Br.-Blk.-Or. Screen Dropping-See Note 2
57	470KΩ	½		BTS-470K	Yl.-Vl.-Yl. Output Grid
58	220KΩ	½		BTS-220K	Red-Red-Yl. Bias Filter
59	1.5Ω	1	73081	BW-1-150	Br.-Grn.-Br. Bias
60	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Series Phono-See Note 3
61	2000Ω	5	73002	AB-2000	Filter
62	1.5Ω	1	73003	BW-1-1.5	Cutter Shunt
63	.47Ω	1	73010	BW-1-.47	Output Transformer Sec. Loading

Note 1-Items 41 and 26A & B are combined in one unit.
Note 2-Some models use two 5600Ω 1W resistors in series in this application.
Note 3-Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA PACKARD-BELL PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
64	117V AC @ 45~	500V CT @ 0.6A DC	4.7V AC @ 2.0A	6.0V AC @ 2.2A	89016B	P-6119‡	T22R02‡	P-2951‡

‡Add series resistor to reduce plate voltage.

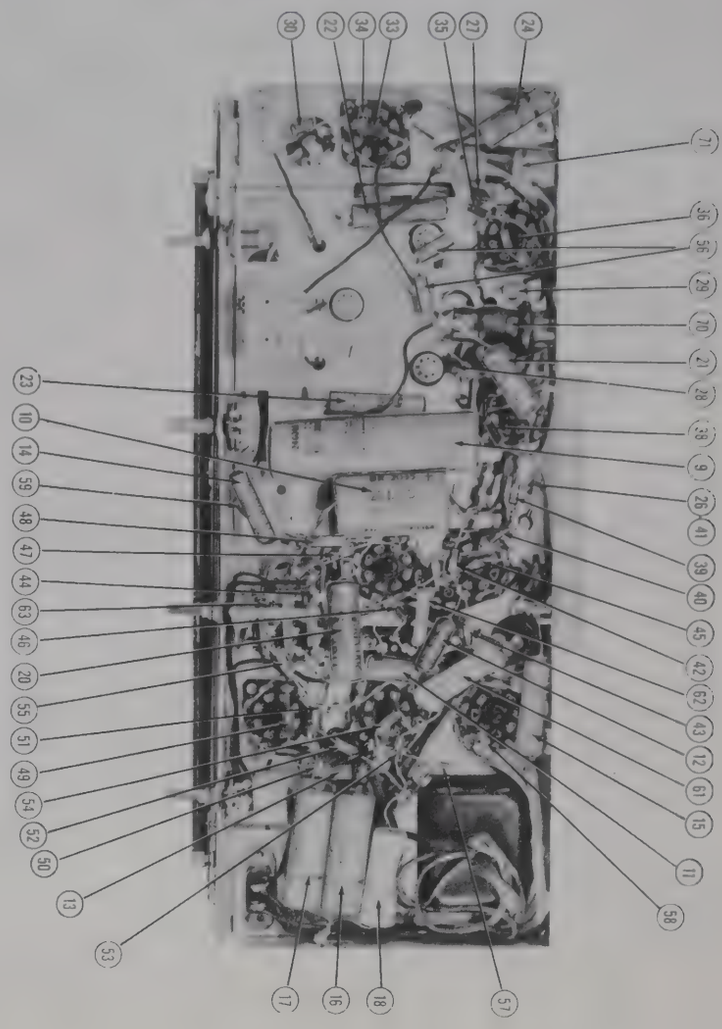
TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA PACKARD-BELL PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
65	6300Ω	4.1Ω	800Ω	.9Ω	89405	A-3877‡	T22S58	A-2930‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA PACKARD-BELL PART No.	REPLACEMENT DATA JENSEN PART No.	REPLACEMENT DATA QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-12?		‡Replace output transformer to match
66	PM	4.1Ω	83703	Mod. P10-T	10A31	6-8Ω voice coil.
	CONE DIA.	VC DIA.				
67	9½"	1"				

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

R F COILS

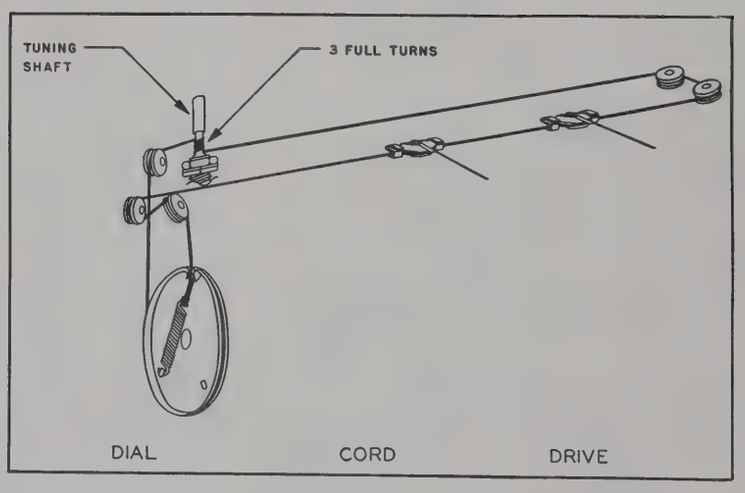
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PACKARD-B. PART No.	REPLACEMENT DATA MEISSNER PART No.
68	Loop Ant.		.4Ω	92194	
69	Ant. Coil		5.4Ω	29400-B	
70	RF Coil	8Ω	5.3Ω	29102-F	14-1057
71	Osc. Coil	1Ω	5.9Ω	29205-C	14-1060
72	Input IF	17.2Ω	17.2Ω	29004-E	16-6658
73	Output IF	21Ω	21Ω	29007	16-6660

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PACKARD-BELL PART No.	INSTALLATION NOTES
74	Bayonet	6-8	0.25	Blue	54001	Type 44
75	"	6-8	0.25	"	54001	" "

MISCELLANEOUS

ITEM No.	PART NAME	PACKARD-BELL PART No.	NOTES
76	Switch	86005A	Radio-Phono-Record
77	3 Gang Var. Cap.	23520	(30-455MMF) each section
A5	Trimmer	23406	Osc. Adj.
A6	Padder	23402	" "
A7	Trimmer	23400	RF Adj.
A8	"	23400	Ant. Adj.
	Dial Glass	38082	Stationized
	" "	38083	Export
	Pointer Assby.	67026A	



RECORDING HEAD PRESSURE

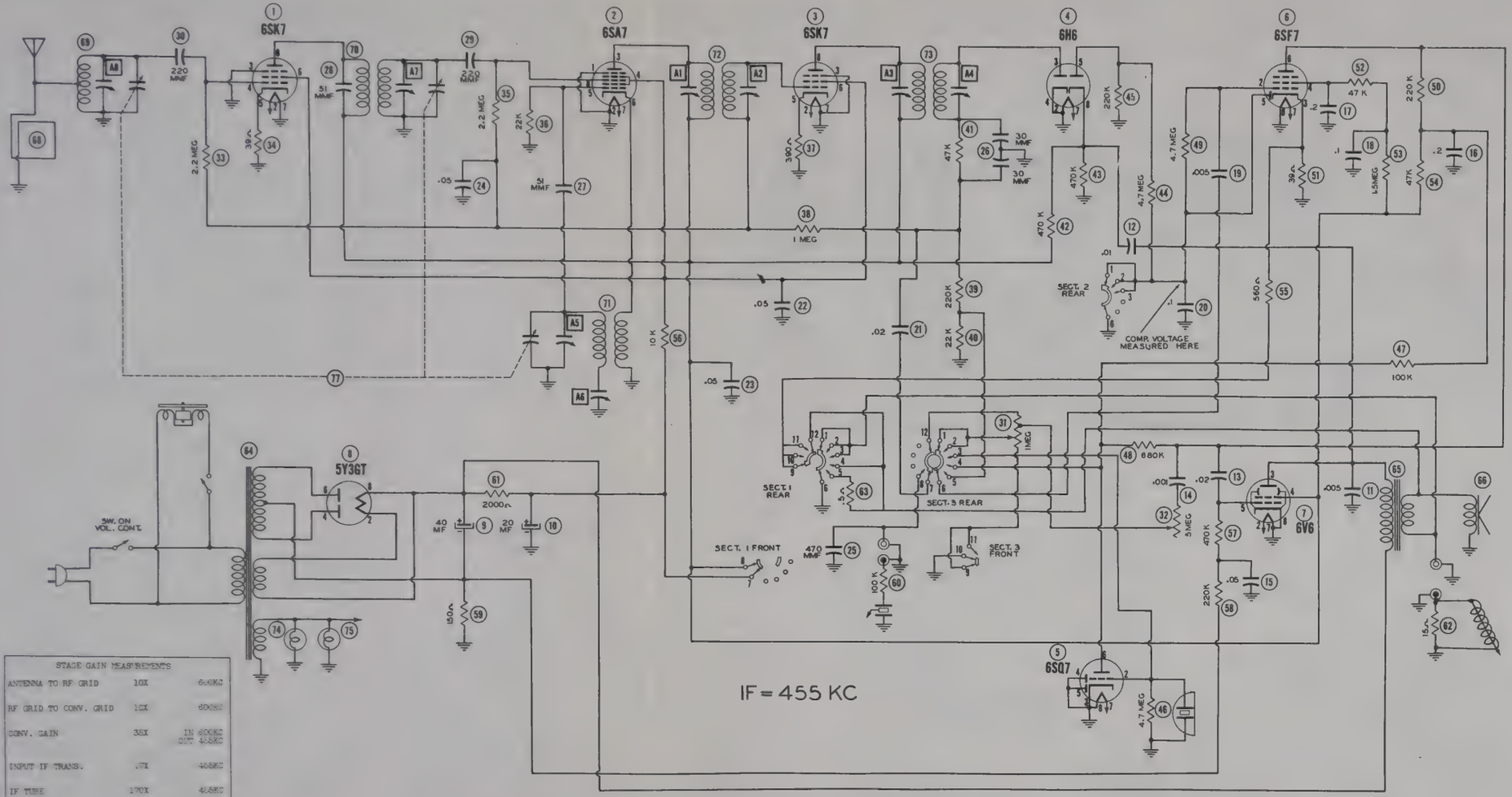
The proper recording head pressure is 1¼ oz. Adjustment of this pressure is made by turning the small screw on the top of the recording arm. This adjustment is very critical and should be made in quarter turns. TURN THE SCREW CLOCKWISE TO INCREASE THE CUTTING DEPTH and COUNTERCLOCKWISE TO DECREASE THE CUTTING DEPTH.

This adjustment is made at the factory with an ordinary postal scale, consequently, field adjustments should be made in a like manner.

HOW TO CHECK COMPRESSION VOLTAGE

Turn the Selector Switch to Radio Record position. Feed a 1 volt (RMS) 1000 cycle signal into the diode return of the 2nd IF (brown lead). Connect the leads of a vacuum tube voltmeter to the point indicated on schematic diagram, and ground. The voltage at this point should be approximately a minus 2.25 volts.

DATE 10/49-#4817-17 SET #47-FOLDER #17



STAGE GAIN MEASUREMENTS		
ANTENNA TO RF GRID	10X	600KC
RF GRID TO CONV. GRID	1CX	600KC
CONV. GAIN	35X	IN 600KC OUT 455KC
INPUT IF TRANS.	.7X	455KC
IF TUBE	170X	455KC
OUTPUT IF TRANS.	.8X	455KC
AUDIO	15X	400 ~
OUTPUT	30X	400 ~
MOD. AMP.	25X	400 ~

VOLTAGE READINGS

RADIO-PHONO SWITCH IN RADIO POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0V.	0V.	0V.	-.2VDC	.3VDC	90VDC	6VAC	215VDC
2	6SA7	0V.	0V.	215VDC	90VDC	-0.6VDC$	0V.	6VAC	-.2VDC
3	6SK7	0V.	0V.	0V.	-.2VDC	1.6VDC	90VDC	6VAC	215VDC
4	6H6	0V.	0V.	-1.4VDC	0V.	0V.	0V.	6VAC	105VDC
5	6SQ7GT	0V.	-.8VDC	0V.	0V.	0V.	90VDC	6VAC	0V.
6	6SF7	0V.	-.7VDC	0V.	15VDC	0V.	65VDC	6VAC	0V.
7	6V6GT	0V.	0V.	236VDC	215VDC	-2.8VDC	165VDC	6VAC	0V.
8	5Y3GT	0V.	260VAC	-5.6VDC	250VAC	-5.6VDC	250VAC	0V.	260VDC

$TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	6SK7	0Ω	0Ω	0Ω	3.4 Meg.	3.0Ω	52KΩ	.1Ω	42KΩ
2	6SA7	0Ω	0Ω	42KΩ	52KΩ	22KΩ	1Ω	.1Ω	3.4 Meg.
3	6SK7	0Ω	0Ω	0Ω	1.2 Meg.	3.0Ω	52KΩ	.1Ω	42KΩ
4	6H6	0Ω	0Ω	300KΩ	0Ω	220KΩ	INF.	.1Ω	240KΩ
5	6SQ7GT	0Ω	4.7 Meg.	0Ω	0Ω	0Ω	240KΩ	.1Ω	0Ω
6	6SF7	0Ω	4 Meg.*	39Ω	1.6 Meg.	0Ω*	2.0KΩ	.1Ω	0Ω
7	6V6GT	0Ω	0Ω	40KΩ	42KΩ	690KΩ	100KΩ	.1Ω	0Ω
8	5Y3GT	INF.	40KΩ	220KΩ	240Ω	150Ω	250Ω	INF.	40KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

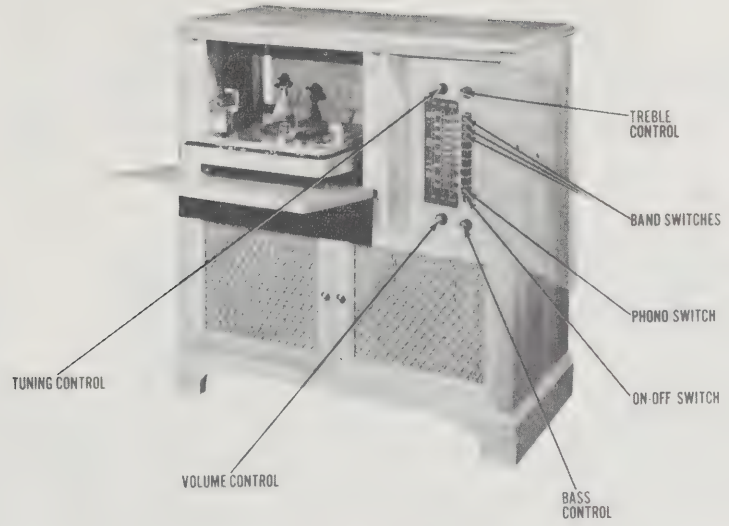
1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

PHILCO MODEL
48-1290



PHILCO MODEL 48-1290

TRADE NAME	Philco, Model 48-1290
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio, 2 Band AM-FM Superheterodyne Receiver.
TUBES	(THIRTEEN) Types, 6AU6 FM RF Amp., 7F8 Converter, 6BA6 1st IF Amp., 7A7 2nd IF Amp., 6BA6 3rd IF Amp., FM1000 FM Det., 6SQ7GT AM Det.-AVC-AF', 7AF7 Phono Amp.-Phase Inv., 7F7 AF Amp., 7E7 Rect.-Reactance, (2) 6V6GT Power Output, 5U4G Rectifier.
POWER SUPPLY	105-120 Volts AC — RATING 1.02 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1720KC — **SHORT WAVE** 9.3-15.5MC FREQ. MOD. 88-108MC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer 3-5/16" from left edge of dial backplate.

When complete alignment must be made AM alignment must be done first. If AM Alignment is not necessary, then FM only may be done.

AM ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to front AM stator of tuning cap. Low side to chassis.	455KC	BC (Button depressed)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4, A5,A6	Adjust for maximum output in order given. Do not repeat.
2		Connect receiver loop to chassis. Use radiation loop.	15MC	SW (Button depressed)	6-3/16" from calibration mark.	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Tune sig. gen. to 15.9MC. If signal is not heard, retune sig. gen. to 15MC and loosen A7 to next peak. Adjust for maximum output and recheck for image.
3		"	"	"	Tune for maximum output.	"	A8	Rock tuning cap. and adjust for maximum output.
4		"	1700KC	BC	6½" from calibration mark.	"	A9	Adjust for maximum output
5		"	1500KC	"	Tune for maximum output.	"	A10	" " " "
6		"	580KC	"	"	"	A11	Rock tuning cap. and adjust for maximum output. Repeat Steps 4, 5 and 6 until no further improvement can be made making Step 4 last adjustment.

FOR FM ALIGNMENT SEE PAGE 2 OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 10/48-#4817-18 SET #47-FOLDER #18

FM ALIGNMENT

In Step 19 of output meter alignment and Step 16 of scope alignment connect a dipole to Pins 1 & 2 of FM antenna socket. Connect dipole to output of signal generator and space dipoles several feet apart. Each dipole may consist of two 30" lengths of wire.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND OUTPUT METER

Load network consists of 4700Ω resistor in series with .1 MFD cap. In Step 7 it will be necessary to force a piece of wire or solder down between ceramic from of A13 and edge of trimmer plate. Then attach load to this wire and chassis.

In Steps 17 & 20 use a tuning wand to adjust FM coils. If output increases when brass end of wand is inserted in coil, expand coil slightly. If output increases upon insertion of powdered iron end of wand compress coil slightly. Coil is properly adjusted when insertion of either end of wand causes a decrease in output.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
7	.1 MFD.	High side to switch tap of FM RF Coil (186). Low side to chassis.	9.1MC (Modulated)	FM Button Depressed	Tuning cap. fully closed	Across voice coil	A12	Ground Pin 2 of FM1000 tube to chassis. Connect load network (See prealignment notes) from high side of secondary of FM 4th IF Trans. (193) to chassis. Adjust A12 for maximum output.
8	.1 MFD.	"	"	"	"	"	A13	Transfer load network to Pin 5 (plate) of 6BA6 3rd IF Tube (5) to chassis. Adjust A13 for maximum output.
9	.1 MFD.	"	"	"	"	"	A14	Transfer load network to Pin 1 (grid) of 6BA6 3rd IF Tube (5) to chassis. Adjust A14 for maximum output.
10	.1 MFD.	"	"	"	"	"	A15	Transfer load network to Pin 2 (plate) of 7A7 2nd IF Tube (4) to chassis. Adjust A15 for maximum output.
11	.1 MFD.	"	"	"	"	"	A16	Transfer load network to Pin 6 (grid) of 7A7 2nd IF Tube (4).to chassis. Adjust A16 for maximum output.
12	.1 MFD.	"	"	"	"	"	A17	Transfer load network to Pin 5 (plate) of 6BA6 1st IF Tube (3) to chassis. Adjust A17 for maximum output.
13	.1 MFD.	"	"	"	"	"	A18, A19	Leave load network as in last Step, adjust A18 and A19 for maximum output. Remove short from Pin 2 of FM1000 tube, and remove load network.
14	.1 MFD.	High side to Pin 1 (grid) of 6BA6 3rd IF Tube (5). Low side to chassis.	9.1MC (unmodulated)	"	"	"	A20	Connect jumper from Pin 4 (plate) of FM1000 tube to junction of resistor (133) and capacitors (37) and (64). Adjust A20 for zero beat.
15	.1 MFD.	"	"	"	"	"	A21	Remove jumper from previous step and adjust A21 for zero beat.
16	.1 MFD	High side to Pin 2 (yellow lead) of FM AC line aerial socket. Low side to chassis.	105MC (Modulated)	"	5-5/16" from calibration mark.	"	A22	Connect short from Pin 2. of FM1000 tube to chassis. Adjust A22 for maximum output.
17	.1 MFD.	"	88MC	"	1/4" from calibration mark.	"	FM Osc Coil (189)	Adjust per prealignment notes. Repeat Steps 11 & 17 until no further improvement can be made.
18	.1 MFD.	"	105MC	"	Tune for maximum output.	"	A23	Rock tuning cap. and adjust for maximum output.
19	Dipole	See prealignment notes.	"	"	"	"	A24	"
20	Dipole	"	92MC	"	"	"	FM RF Coil (186) & Ant. Coil (184)	Adjust per prealignment notes. Repeat Steps 18, 19 and 20 until no further improvement can be made. Remove short from Pin 2 of FM1000 tube.

FOR AM ALIGNMENT SEE PAGE 1 OF THIS FOLDER.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

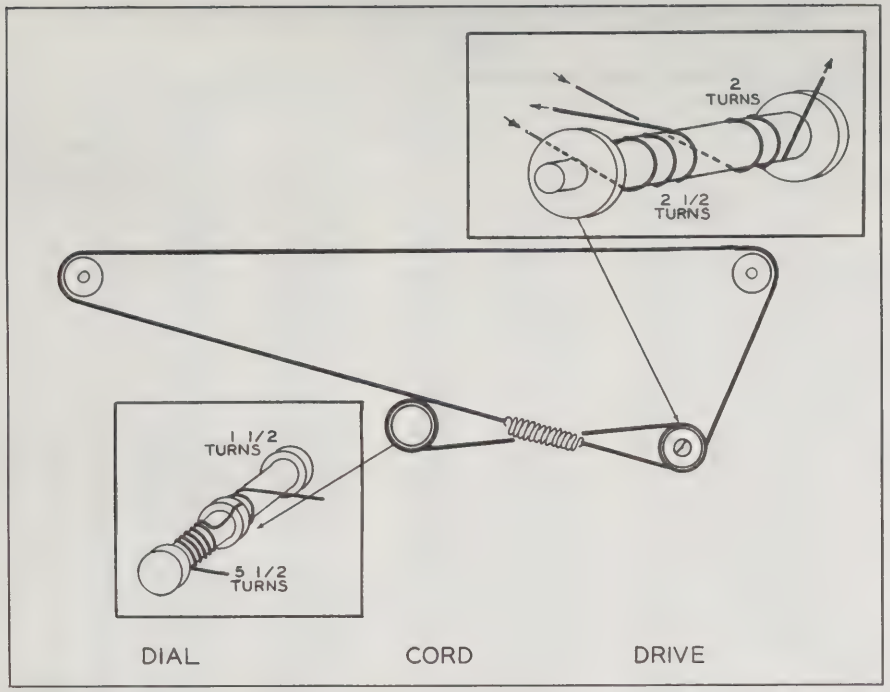
Use a freq. modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
7	.1 MFD.	High side to Pin 1 (grid) of 6BA6 3rd IF Tube (5). Low side to chassis.	9.1MC (Freq. Mod.)	FM	Tuning cap. fully closed	Vertical input to Point A. Ground to chassis.	A12, A13	Short pin 2 of FM1000 tube to chassis. Short Pin 4 of FM1000 tube to junction of resistor (133) and capacitors (37) & (64). Adjust A12 & A13 for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
8	.1 MFD.	High side to Pin 6 (grid) of 7A7 2nd IF Tube (4). Low side to chassis.	"	"	"	"	A14, A15	Adjust for maximum amplitude, symmetry and coincidence.
9	.1 MFD.	High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	"	"	"	"	A16, A17	"
10	.1 MFD.	High side to Pin 1 (grid) of 7F8. Low side to chassis.	"	"	"	"	A18, A19	Adjust for maximum amplitude, symmetry and coincidence. Remove only the short from Pin 2 of FM1000 tube.
11	.1 MFD.	"	Adjust freq. for coincidence of pattern.	"	"	"	A20	Adjust for coincidence of two pips at peak of pattern per Fig. 2. Remove short from Pin 4 of FM1000 tube.
12	.1 MFD.	"	Leave at exact setting of previous step.	"	"	"	A21	Adjust for crossover of pattern at horizontal sweep line per Fig. 3.
13	.1 MFD.	High side to Pin 2 (yellow socket) of FM AC line aerial socket. Low side to chassis.	105MC (Freq. Mod.)	"	1/4" from calibration mark.	"	A22	Short Pin 2 of FM1000 tube to chassis. Adjust for coincidence of peaks per pattern of Fig. 1.
14	.1 MFD.	"	88MC (Freq. Mod.)	"	1/4" from calibration mark.	"	FM Osc Coil (189)	Compress or expand coil slightly for coincidence of peaks per pattern of Fig. 1. Repeat Steps 13 & 14 until no further improvement can be made.
15	.1 MFD.	"	105MC	"	Tune for coincidence	"	A23	Rock tuning cap. to maintain coincidence while adjusting A23 for maximum amplitude of pattern per Fig. 1.
16	Dipole	See prealignment notes.	"	"	"	"	A24	"
17	Dipole	"	92MC	"	"	"	FM RF Coil (186) & Ant. Coil (184)	Compress or expand coils slightly for maximum amplitude of pattern per Fig. 1. Repeat Steps 15, 16 and 17 until no further improvement can be made. Remove short from Pin 2 of FM1000 tube.

FIG. 1

FIG. 2

FIG. 3



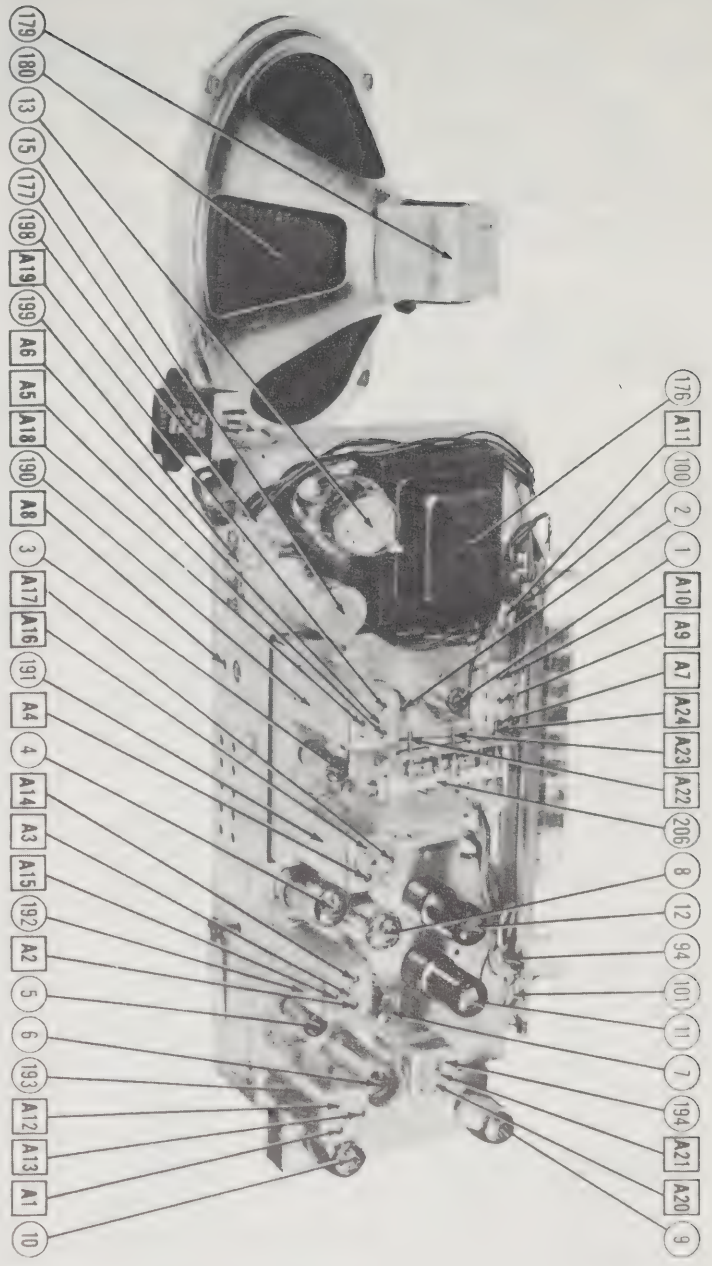
DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove phono-motor plug from rear of chassis.
3. Remove loop antenna leads from terminal strip on rear of chassis.
4. Remove FM antenna plug from rear of chassis.
5. Remove phono-compartment light from bracket it top of compartment.
6. Remove pilot light from front of cabinet.
7. Remove speaker plug from speaker.
8. Remove phono-pickup plug from phono matching transformer.
9. Disconnect phono input plug.
10. Remove two Phillips head wood screws holding phono matching transformer in cabinet. Remove from cabinet.
11. Remove four hex head machine screws holding chassis in cabinet. Remove chassis from cabinet.
12. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.

PUSHBUTTON ADJUSTMENTS

Ranges of pushbuttons reading from left to right are 540-1000KC, 600-1200KC, 650-1300KC, 850-1500KC, 900-1600KC, 900-1600KC.

1. Make up a list of stations desired to be set up ranging from low to high frequency stations, making certain each station falls within range of its button.
2. Push in button next to off button and allow receiver to warm up for about 15 minutes.
3. Adjust B1 to tune in first station on list. Check for correct station by pushing in BC button and manually tune in desired station.
4. Returning to original button adjust B2 for maximum volume.
5. Set up the remaining buttons by following the same procedure outlined above adjusting B3, B5, B7, B9 & B11 to tune in stations, and B4, B6, B8, B10 and B12 for maximum vol...



DATE 10/48-#4817-18 SET #47-FOLDER #18

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	6AU6	6AU6	7BK	
2	Converter	7F8	7F8	8BW	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	2nd IF Amp.	7A7	7A7	8V	
5	3rd IF Amp.	6BA6	6BA6	7BK	
6	FM Detector	FM1000	FM1000		
7	AM Det.-AVC-AF	6SQ7GT	6SQ7GT	8Q	
8	Phono Amp.-& Phase Inv.	7AF7	7AF7	8AC	
9	AF Amp.	7F7	7F7	8AC	
10	Rect. & Reactance	7E7	7E7	8AE	
11	Power Output	6V6GT	6V6GT	7AC	
12	" "	6V6GT	6V6GT	7AC	
13	Rectifier	5U4G	5U4G	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
14	40	450	30-2568-5	AF8J	UP4045	DY-40-450	EL-4	Filter
15A	10	450	30-2570-19	AF2222J*	UP11145C	DH-2x8-450	EL-210#	▲ "
B	10	450						▲ "
16	10	450	30-2417-6	PRS450/10	BR1045	M-10-450	UT-12	FM Det. Decoupling
17	.01	600	30-1226-1	684-01	DT6S1	MPH-6-01	TC-11	Line Filter
18	.01	600	30-1226-1	684-01	DT6S1	MPH-6-01	TC-11	" "
19	.003	1000	61-0117	1084-003	MD16D3	STM-16-003	TR-23	RF Bypass Pwr. Supply
20	.003	1000	61-0117	1084-003	MD16D3	STM-16-003	TR-23	Output Plate Bypass
21	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
22	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	" "
23	.02	400	61-0108	484-02	DT4S2	ST-4-02	TC-12	" "
24	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Bias Filter
25	.02	400	61-0108	484-02	DT4S2	ST-4-02	TC-12	" "
26	.03	400	45-3500-1	484-03	DT4S3	ST-6-03	TC-13	" "
27	.002	600	61-0062	684-002	DT6D2	ST-6-002	TC-22	Audio Coupling
28	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Diode Filter
29	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	" "
30	.001	600	45-3550-5	684-001	DT6D1	ST-6-001	TC-21	Audio Coupling
31	.001	600	45-3500-5	684-001	DT6D1	ST-6-001	TC-21	Tone Comp.
32	.006	600	45-3500-7	684-006	DT6D6	ST-6-006	TC-26	Audio Coupling
33	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Tone Comp.
34	.1	400	61-0113	484-.1	DT4P1	ST-4-1	TC-1	Phono Amp. Plate Decoup
35	.02	400	61-0108	484-02	DT4S2	ST-4-02	TC-12	Audio Coupling
36	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	Tone Comp.
37	.03	400	45-3500-1	484-03	DT4S3	ST-4-03	TC-13	Audio Coupling
38	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	FM Det.-Screen Bypass
39	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	Fil. Bypass
40	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass
41	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	Audio Coupling
42	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	3rd IF Plate Decoup.
43	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	3rd IF Screen Bypass
44	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	3rd IF Cathode Bypass
45	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Switch Bypass
46	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	3rd IF Fil. Bypass
47	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	RF Bypass Pwr. Supply
48	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	2nd IF Plate Decoup.
49	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	2nd IF Screen Bypass
50	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	2nd IF Cathode Bypass
51	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	2nd IF Fil. Bypass
52	.05	200	61-0122	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
53	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	" "
54	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	1st IF Plate Decoup.
55	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	1st IF Screen Bypass
56	.006	400	45-3500-7	484-006	DT6D6	ST-6-006	TC-26	1st IF Fil. Bypass
57	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	AVC Filter
58	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Conv. Plate Decoup.
59	.5	200	61-0133	484-.5	DT2P5	ST-2-5	TC-5	Bias Filter
60	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	FM Det. Decoup.
61	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	AF Plate Bypass

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
115	330Ω	±	66-4333340	BTS-330K	Or.-Or.-Yl. AVC Network
116	180Ω	±	66-1183340		Br.-Gray-Br. 2nd IF Cathode
117	1500Ω	±	66-2153340	BTS-1500	Br.-Grn.-Red 2nd IF Cathode
118	100KΩ	±	66-4103340	BTS-100K	Br.-Blk.-Yl. 2nd IF Screen Dropping
119	100KΩ	±	66-4103340	BTS-100K	Br.-Blk.-Yl. 2nd IF Screen Bleeder
120	3300Ω	±	66-2333340	BTS-3300	Or.-Or.-Red 2nd IF Plate Decoup.
121	180Ω	±	66-1183340		Br.-Gray-Br. 3rd IF Cathode
122	47KΩ	±	66-3473340	BTS-47K	Yl.-Vi.-Or. 3rd IF Screen
123	3300Ω	±	66-2333340	BTS-3300	Or.-Or.-Red 3rd IF Plate Decoup.
124	100Ω	±	66-1103340		Br.-Blk.-Br. Feedback
125	47KΩ	±	66-3473340	BTS-47K	Yl.-Vi.-Or. Diode Filter
126	270KΩ	±	66-4273340	BTS-270K	Red-Vi.-Yl. Diode Load
127	1 Meg.	±	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
128	100KΩ	±	66-4103340	BTS-100K	Br.-Blk.-Yl. Tone Comp.
129	27Ω	±	66-0273340		Red-Vi.-Blk. Par. Supp.
130	16KΩ	±	66-3163340	BTS-15K	Br.-Blue-Or. FM Det. Grid
131	56KΩ	±	66-3563340	BTS-56K	Grn.-Blue-Or. FM Det. Screen
132	16KΩ	±	66-3163340	BTS-15K	Br.-Blue-Or. FM Det. Decoup.
133	47KΩ	±	66-3473340	BTS-47K	Yl.-Vi.-Or. FM Det. Plate Load
134	100KΩ	±	66-4103340	BTS-100K	Br.-Blk.-Yl. Tone Comp.
135	33KΩ	±	66-3333340	BTS-33K	Or.-Or.-Or. " "
136	1 Meg.	±	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. 1st AF Grid
137	10 Meg.	±	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue Bias Network
138	1 Meg.	±	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. "
139	100KΩ	±	66-4103340	BTS-100K	Br.-Blk.-Yl. Audio Voltage Divider
140	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. 1st AF Plate Load
141	1 Meg.	±	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Phase Inv. Grid
142	470Ω	±	66-2473340	BTS-4700	Yl.-Vi.-Red Phase Inv. Cathode
143	47KΩ	±	66-3473340	BTS-47K	Yl.-Vi.-Or. Phase Inv. Cathode
144	56KΩ	±	66-3563340	BTS-56K	Grn.-Blue-Or. Phase Inv. Plate Load
145	4.7 Meg.	±	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. Phono Amp. Grid
146	680Ω	±	66-2683340	BTS-6800	Blue-Gray-Red Phono Amp. Cathode
147	150KΩ	±	66-4153340	BTS-150K	Br.-Grn.-Yl. Phono Amp. Plate Load
148	470KΩ	±	66-4473340	BTS-470K	Yl.-Vi.-Yl. Phono Amp. Decoup.
149	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. Tone Comp.
150	330KΩ	±	66-4333340	BTS-330K	Or.-Or.-Yl. Output Grid
151	330KΩ	±	66-4333340	BTS-330K	Or.-Or.-Yl. " "
152	68Ω	±	66-0683340	BW-½-68	Blue-Gray-Blk. Feedback
153	4.7Ω	±	66-0473340	BW-½-4.7	Yl.-Vi.-Gold "
154	330KΩ	±	66-4333340	BTS-330K	Or.-Or.-Yl. 1st Supp. Amp. Grid
155	680KΩ	±	66-4683340	BTS-680K	Blue-Gray-Yl. Tone Comp.
156	2200Ω	±	66-2223340	BTS-2200	Red-Red-Red 1st Supp. Amp. Cathode
157	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. 1st Supp. Amp. Plate Load
158	560KΩ	±	66-4563346	BTS-560K	Grn.-Blue-Yl. 2nd Supp. Amp. Grid
159	100KΩ	±	66-4103340	BTS-100K	Br.-Blk.-Yl. 2nd Supp. Amp. Plate Load
160	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. Bias Network
161	3.3 Meg.	±	66-5333340	BTS-3.3 Meg.	Or.-Or.-Grn. " "
162	1.5 Meg.	±	66-5153340	BTS-1.5 Meg.	Br.-Blk.-Grn. " "
163	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. " "
164	560KΩ	±	66-4563340	BTS-560K	Grn.-Blue-Yl. " "
165	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. " "
166	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. " "
167	33KΩ	1	66-3334340	BTA-33K	Or.-Or.-Or. Reactance Screen Dropping
168	33KΩ	1	66-3334340	BTA-33K	Or.-Or.-Or. Reactance Screen Bleeder
169	18KΩ	±	66-3183340	BTS-18K	Br.-Gray-Or. Reactance Plate Load
170	1 Meg.	±	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. Reactance Grid
171	100KΩ	±	66-4103340	BTS-100K	Br.-Blk.-Yl. Tone Comp.
172	5600Ω	1	66-2564340	BTA-5600	Grn.-Blue-Red Filter
173	220KΩ	±	66-4223340	BTS-220K	Red-Red-Yl. Bias
174	1 Meg.	±	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. "
175	10Ω	1	66-0103340	BW-1-10	Br.-Blk.-Blk. Series Pilot Light

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: PHILCO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
176	117V AC @ 1.04A	600V CT @ .15A DC	5.0V AC @ 3.1A SEC. 4 6.5V CT @ .3A	6.5V AC @ 4.3A	32-8282	P-6014†† and P-6134‡	T22R33†† and T21F08	P-2954†† and P-2444‡

‡Add series resistor to reduce plate voltage.
††Drill new mounting holes.

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
62	22	500	60-00205307	1468-000025	5W5Q25	MO.5-425	1FM-425	RF Bypass
63	100	500	30-1224-1	1468-0001	5W5T1	MO.5-31	1FM-31	Tone Comp.
64	1500	300	60-20155404	1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass-Cer.
65	33	500	60-00305307	1468-00003	5W5Q3	MO.5-43	1FM-43	Det.-Grid Cap.
66	100	500	30-1224-1	1468-0001	5W5T1	MO.5-31	1FM-31	IF Coupling
67	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	Diode RF Filter
68	100	500	30-1224-1	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
69	330	500	60-10335407	1468-0003	5W5T3	MO.5-33	1FM-33	Phase Shift
70	330	500	60-10335407	1468-0003	5W5T3	MO.5-33	1FM-33	Audio Coupling
71	150	500	60-10155407	1468-00015	5W5T15	MO.5-315	1FM-315	" "
72	500	500	60-10475307	1468-0005	5W5T5	MO.5-35	1FM-35	RF Bypass Pwr. Supply
73	220	300	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	1st IF Screen Byp.-Cer.
74	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	Switch Bypass
75	220	300	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	RF Byp. Pwr. Supply-Cer.
76	220	300	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	" " " " "
77	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	2nd IF Screen Bypass
78	100	500	60-10105407	1469-0001	5R5T1	MOS.5-31	MS-31	Osc. Grid Cap.
79	750	500	60-10755301	1479-00075	2R5T7	MWS.5-37	MS-37	Osc. Coupling
80	500	500	60-10475307	1469-0005	5R5T5	MOS.5-35	MS-35	Osc. Feedback
81	220	300	60-10205307	1469-0002	5R5T2	MOS.5-32	MS-32	" " " -Cer.
82	255	500	30-1220-24					Fixed Padder
83	285	300	30-1224-14	1469-0003	5R5T3	MOS.5-33	MS-33	Osc. Coupling-Cer.
84	485	300	30-1224-15					Osc. Cathode Bypass-Cer.
85	10	500	60-00105407	1469-00001	5R5Q1	MOS.5-41	MS-41	Osc. Coupling
86	300	500	60-10305307	1469-0003	5R5T3	MOS.5-33	MS-33	Fixed Padder
87	22	500	60-00205307	1468-00002	5W5Q2	MO.5-42	1FM-42	RF Coupling
88	33	500	60-00305307	1468-000025	5W5Q3	MO.5-43	1FM-43	FM RF Coupling
89	1500	300	60-20155404	1467-0015	1W5D15	MW.5-215	1FM-215	RF Byp. Power Supply-Cer.
90	1500	300	60-20155404	1467-0015	1W5D15	MW.5-215	1FM-215	FM RF Screen Bypass-Cer.
91	220	300	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	FM RF Fil. Bypass-Cer.
92	100	500	30-1224-1	1468-0001	5W5T1	MO.5-31	1FM-31	FM RF Cathode Bypass
93	10	500	60-00105407	1468-00001	5W5Q1	MO.5-41	1FM-41	FM RF Coupling

*Omit two sections.
#Use mounting plate supplied by manufacturer.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
94A	2 Meg.	½	33-5535-5	D16-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 94A per instructions
95	1 Meg.	½	33-5539-7		M-61-S	Bass Control
96A	500KΩ	½	33-5538-22		M-60-Z	Treble Control
B	Switch		Not Req.		SW-A5	Attach to 96A per instructions

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
97	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. FM RF Grid
98	82Ω	½	66-0823340		Gray-Red-Blk. FM RF Cathode
99	56KΩ	½	66-3563340	BTS-56K	Grn.-Blue-Or. FM RF Screen
100	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. Conv. Grid
101	4.7 Meg.	½	66-5473340	BTS-4.7 Meg.	Yl.-Vi.-Grn. " "
102	10Ω	½	66-0103340		Br.-Blk.-Blk. Par. Supp.
103	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Conv. Cathode
104	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Conv. Plate Decoup.
105	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Osc. Grid
106	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Osc. Plate Load
107	22KΩ	½	66-3223340	BTS-22K	Red-Red-Or. Osc. Plate Load
108	100Ω	½	66-1013340		Br.-Blk.-Br. Par. Supp.
109	10KΩ	½	66-3103340	BTS-10K	Br.-Blk.-Or. Osc. Cathode
110	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
111	68Ω	½	66-0683340		Blue-Gray-Blk. 1st IF Cathode
112	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. 1st IF Screen
113	330Ω	½	66-2333340	BTS-3300	Or.-Or.-Red 1st IF Plate Decoup.
114	1 Meg.	½	66-5103340	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network

DATE 10/42-#4817-18 SET #47-FOLDER #18

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (MATCHING)

ITEM No.	RATING TURNS RATIO PRI. to SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
177	1 to 70	.3Ω	570Ω	32-8256				

TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
178	8200Ω CT	3.6Ω	580Ω CT	.5Ω	32-8274	A-3924	T2S56	A-2966§	§Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA PHILCO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD RES.	VC IMP.				
179	460Ω	3.6Ω	36-1606		12E60**	**Replace output transformer to match 6-8Ω voice coil.
	CONE DIA.	VC DIA.				
180	11-3/8"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA PHILCO PART No.	MEISSNER PART No.
181	Loop Ant.		0Ω		
182	BC Ant.Coil		.8Ω	32-4049-3	
183	SW Ant.Coil		0Ω	32-4050	
184	FM " "		0Ω	32-3993	
185	Wave Trap		0Ω	32-4111	
186	FM RF Coil		0Ω	32-3992	
187	BC Osc.Coil		3.5Ω	32-4019-4	
188	SW " "		.1Ω	32-3996	
189	FM " "		0Ω	32-3994	
190A	1st IF AM	1Ω	21Ω	32-4020-1	
B	" " FM	1.6Ω	1.5Ω		
191A	2nd IF AM	1.2Ω	7.0Ω	32-4001	
B	" " FM				
192A	3rd IF AM	9Ω	13.5Ω	32-4002	
B	" " FM				
193A	4th " AM	6Ω	9Ω	32-4003-2	
B	" " FM		.3Ω		
194	FM Det.	.6Ω	1.0Ω	32-4004	
195	RF Plate Chk		0Ω	32-4061	
196	RF Choke		0Ω	32-4089	
197	FM Det. Cath. Chk.		.5Ω	32-4007-1	

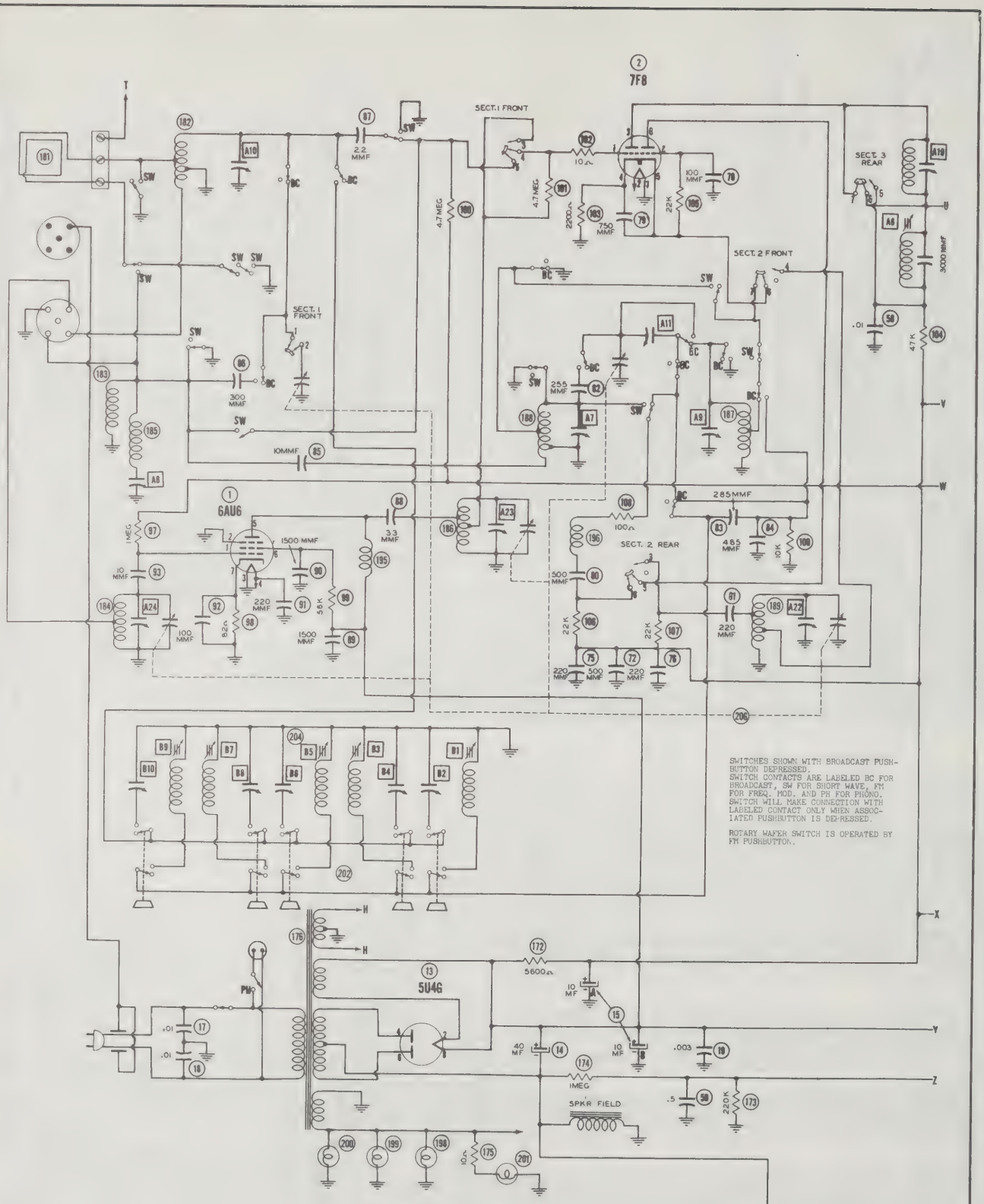
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA PHILCO PART No.		INSTALLATION NOTES
198-201	Bayonet	7.5	0.2	White	34-2040		Type #51

MISCELLANEOUS

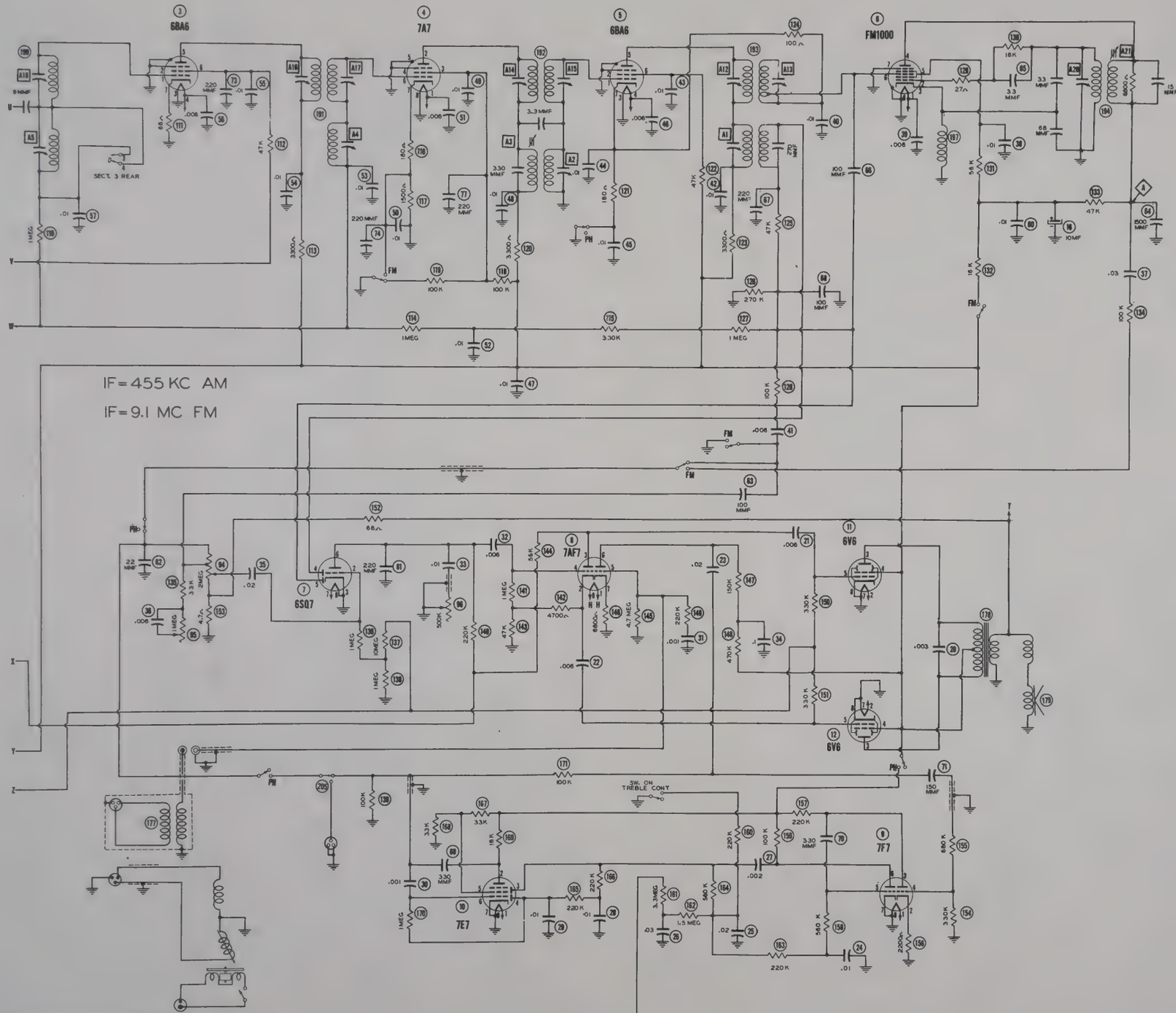
ITEM No.	PART NAME	PHILCO PART No.	NOTES
202	Switch	42-1777	PB Assby.
203	"	76-2211	FM-AM
204	PB Coil Assby.	32-4059	
205	Switch		Pickup Change-over
206	Tuning Gang	31-2694	(18-520MMF, 18-520MMF)
A7	Trimmer Strip	31-6477	SW Osc. Adj.
A9			BC " "
A10			BC Ant. Adj.
A8	Trimmer	31-6473-2	SW " "
A11	Padder	31-6473-3	BC Osc. Adj.
	Cabinet	10697	(less scale)
	Dial Scale	76-3187-4	(includes backplate assby.)
	Pointer	56-3179	
	Knob	54-4227	Control

PHILCO MODEL 48-1290 PAGE 5


2
7F8
SECT. 1 FRONT
SECT. 3 REAR
SECT. 2 FRONT
SECT. 1 FRONT
SECT. 2 REAR
1
6AU6
13
5U4G
SPKR FIELD
SWITCHES SHOWN WITH BROADCAST PUSH-BUTTON DEPRESSED. SWITCH CONTACTS ARE LABELED BC FOR BROADCAST, SW FOR SHORT WAVE, FM FOR FREQ. MOD. AND PH FOR PHONO. SWITCH WILL MAKE CONNECTION WITH LABELED CONTACT ONLY WHEN ASSOCIATED PUSHBUTTON IS DEPRESSED.
ROTARY WAFER SWITCH IS OPERATED BY FM PUSHBUTTON.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

4817-18

VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6AU6	-.2VDC	0V.	0V.	6.5VAC	250VDC	125VDC	.8VDC	-
2	7F8	-.8VDC	6.3VAC	180VDC	1.4VDC	0V.	125VDC	0V.	-4VDC§
3	6BA6	-.2VDC	0V.	0V.	6.3VAC	250VDC	90VDC	.8VDC	-
4	7A7	6.3VAC	250VDC	90VDC	0V.	0V.	-.8VDC	6.7VDC	0V.
5	6BA6	0V.	0V.	0V.	6.3VAC	250VDC	90VDC	1.4VDC	-
‡ 6	6SL7GT	6.3VAC	-.3VDC	0V.	300VDC	40VDC	1.3VDC	0V.	0V.
7	6SQ7GT	0V.	-.6VDC	0V.	-1.3VDC	-.6VDC	100VDC	6.5VAC	0V.
8	7AF7	3.2VAC	55VDC	145VDC	25VDC	0V.	40VDC	2.4VDC	3.2VAC
‡ 9	7F7	6.5VAC	1.3VDC	105VDC	0V.	-.7VDC	210VDC	0V.	6.5VAC
‡ 10	7E7	6.5VAC	105VDC	-.7VDC	-.6VDC	105VDC	-.6VDC	0V.	0V.
11	6V6GT	0V.	6.3VAC	250VDC	260VDC	-4.5VDC	0V.	0V.	0V.
12	6V6GT	0V.	6.3VAC	250VDC	260VDC	-4.5VDC	-.5VDC	00V.	0V.
13	5U4G	6.3VAC	350VAC	6.3VAC	6.3VAC	6.3VAC	350VAC	6.3VAC	260VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	6AU6	3.6 Meg.	0Ω	0Ω	.1Ω	7KΩ	65KΩ	82Ω	-
2	7F8	6 Meg.	.1Ω	6.2KΩ	6.2KΩ	.5Ω	36KΩ	0Ω	22KΩ
3	6BA6	3.6 Meg.	0Ω	0Ω	.1Ω	1KΩ	60KΩ	68Ω	-
4	7A7	.1Ω	1KΩ	110KΩ	0Ω	0Ω	2.6 Meg.	1.7kΩ	0Ω
5	6BA6	3.6 Meg.	0Ω	0Ω	.1Ω	1KΩ	54KΩ	180Ω	-
‡ 6	6SL7GT	.1Ω	1KΩ	.5Ω	7KΩ	50KΩ	220Ω	0Ω	0Ω
7	6SQ7GT	0Ω	1 Meg.	0Ω	340KΩ	1.3 Meg.	220KΩ	.1Ω	0Ω
‡ 8	7AF7	.1Ω	5KΩ	70KΩ	1 Meg.	4.7 Meg.	630KΩ	6.2KΩ	.05Ω
‡ 9	7F7	.1Ω	1.5KΩ	250KΩ	33KΩ	1 Meg.	110KΩ	0Ω	0Ω
‡ 10	7E7	.1Ω	25KΩ	800KΩ	1.2 Meg.	30KΩ	2.2 Meg.	0Ω	0Ω
11	6V6GT	0Ω	.1Ω	7.3KΩ	7KΩ	520KΩ	0Ω	0Ω	0Ω
12	6V6GT	0Ω	.1Ω	7.3KΩ	7KΩ	520KΩ	100KΩ	0Ω	0Ω
13	5U4G	.1Ω	7KΩ	3Ω	510Ω	INF.	500Ω	.1Ω	7KΩ

RADIO-PHONO SWITCH IN PHONO POSITION.

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

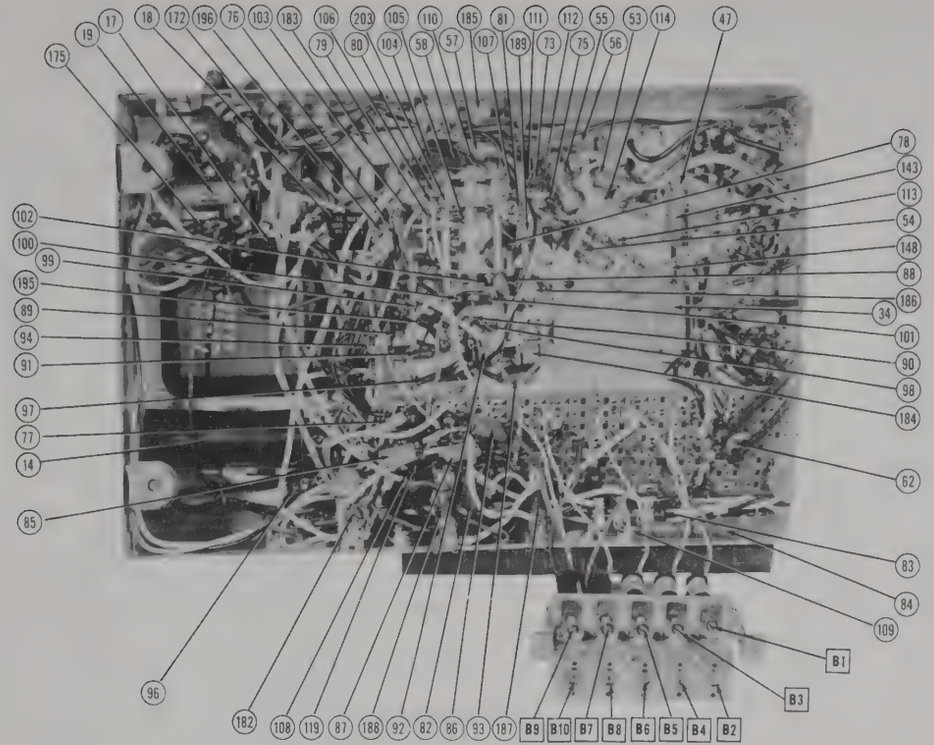
NOTE-TUBES 9 & 10 TAKEN WITH SCRATCH FILTER IN THE ON POSITION.

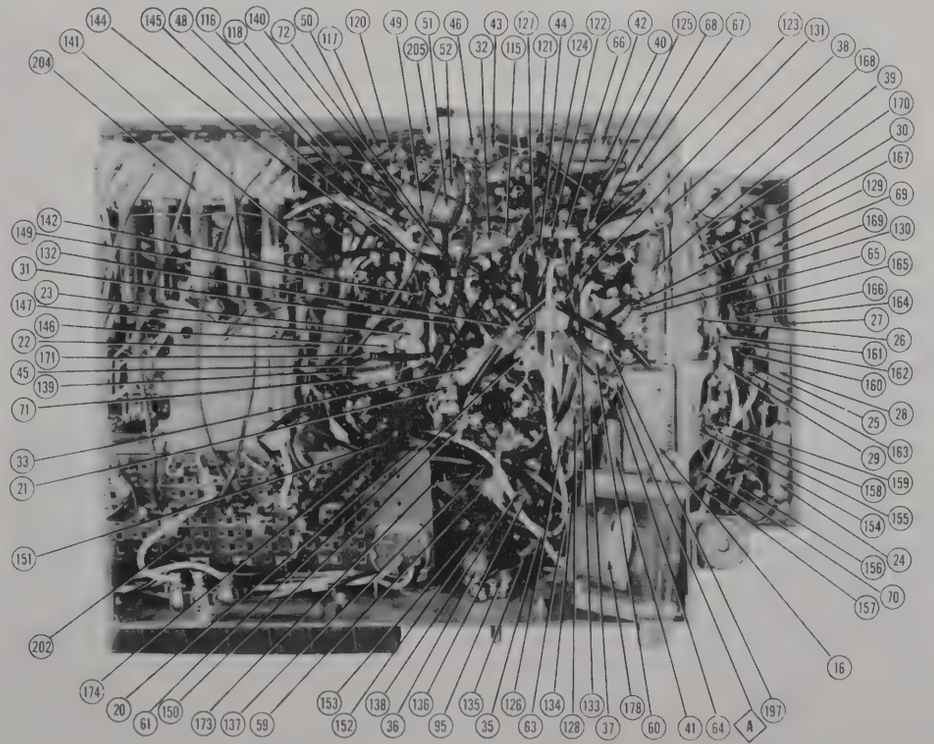
RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

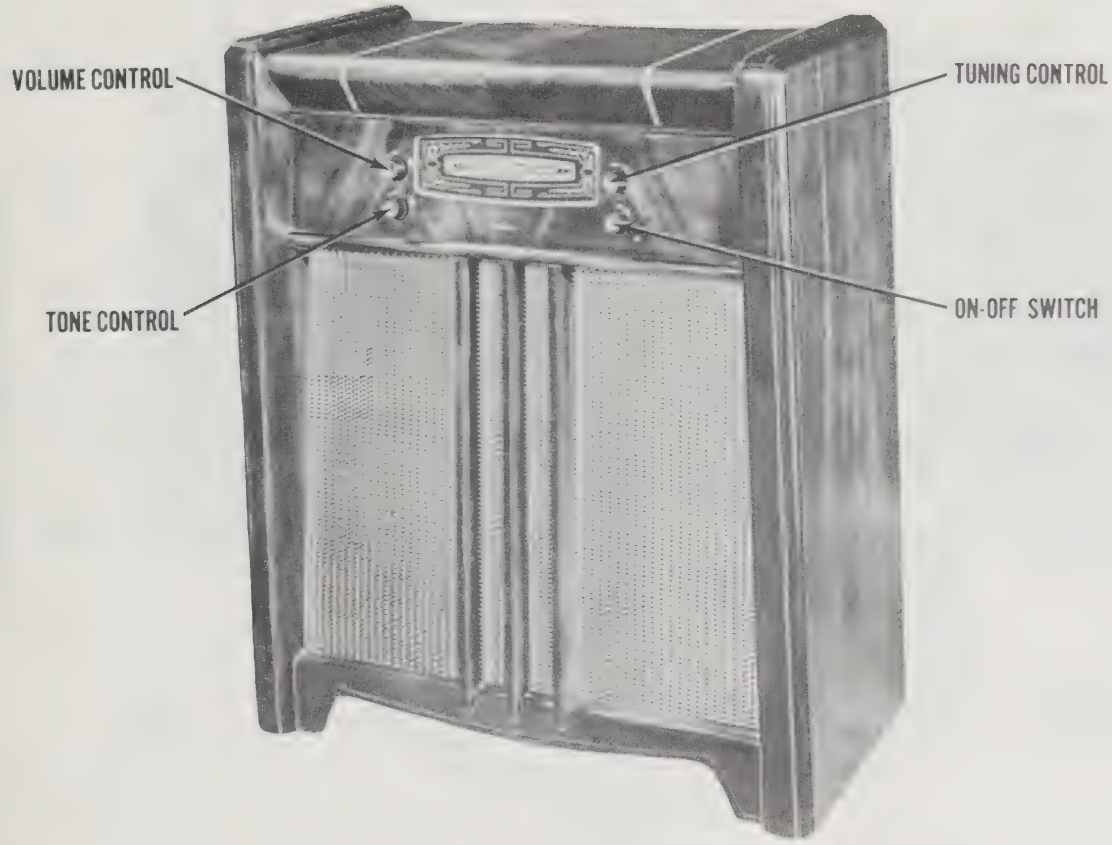
1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

STAGE GAIN MEASUREMENTS		
ANTENNA TO CONVERTER GRID	20X	600KC
CONVERSION GAIN	4X	IN 600KC OUT 455KC
INPUT IF TRANS.	4.5X	455KC
1st IF TUBE	.05X	455KC
INTER. IF TRANS.	70X	455KC
2nd IF TUBE	10X	455KC
INTER. IF TRANS.	1.4X	455KC
3rd IF TUBE	240X	455KC
OUTPUT IF TRANS.	.6X	455KC
AUDIO	35X	400 ∿
PHASE INVERTER	.8X	400 ∿
OUTPUT	25X	400 ∿
PHONO AMP.	35X	400 ∿

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.







PHILCO MODEL 49-1100

TRADE NAME	Philco, Models 48-485, 49-1100
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	AC Operated Combination Phono-Radio, Superheterodyne Receiver with Loop Antenna
TUBES (SIX)	Types, 14AF7 Converter, 7B7 1st IF Amp., 7B7 2nd IF Amp., 7C6 Det.-AVC-AF, 35L6GT Power Output, 50X6 Rectifier.
POWER SUPPLY	105-120 Volts AC
TUNING RANGE—BROADCAST	540-1620KC RATING .38 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set dial pointer turn tuning cap. fully closed and set pointer 3" from extreme left edge of dial backplate. This is the calibration mark referred to in Steps below.

Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD	High side to Pin 5 (grid) of 14AF7. Low side to B-.	455KC	Tuning cap. fully closed.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2		(Connect loop in cabinet to receiver). Connect sig. gen. to radiation loop.	1600KC	5-7/8" from calibration mark.	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		Loop	1500KC	Tune for maximum output.	"	A6	Adjust for maximum output.

PHILCO MODELS
48-485, 49-1100

PHILCO MODELS
48-485, 49-1100

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

PHILCO MODELS 48-485, 48-1100

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	14AF7	14AF7	8AC	
2	1st IF Amp.	7B7	7B7	8V	
3	2nd IF Amp.	7B7	7B7	8V	
4	Det.-AVC-AF	7C6	7C6	8W	
5	Power Output	35L6GT	35L6GT	7AC	
6	Rectifier	50X6	50X6		

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	75	250	30-2575-17		UP3325†		D13263	Filter- Orange
B	10	250			BR1225		" - Red	
8	15	200	30-2575-11	PRS250-16	BR1625	M-16-250	UT-162	Voltage Doubler
9	15	200	30-2575-11	PRS250-16	BR1625	M-16-250	UT-162	" "
10	.05	400	61-0122	484-05	DT4S5	ST-4-05	TC-15	Line Filter
11	.15	400	38-9851-8	484-15*	DT4P1*	ST-4-1*	TC-1*	Line Isolation
12	.05	400	38-9851-4	484-05*	DT4S5*	ST-4-05*	72P1	" "
13	.006	400	30-4504	484-006	DT6D6	ST-6-006	TC-26	Output Plate Bypass
14	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
15	.01	400	61-0120	484-01	DT4S1	ST-4-01	TC-11	" "
16	.006	400	30-4504	484-006	DT6D6	ST-6-006	TC-26	" "
17	.004	600	30-4623	684-004	DT6D4	ST-6-004	TC-24	Tone Comp.
18	.004	600	30-4623	684-004	DT6D4	ST-6-004	TC-24	" "
19	.25	200	61-0125	484-.25	DT2P25	ST-2-25	TC-25	AF Plate Decoupling
20	.003	600	30-4582	684-003	DT6D3	ST-6-003	TC-23	2nd IF Plate Decoupling
21	.05	400	61-0122	484-05	DT4S5	ST-4-05	TC-15	IF Screen Bypass
22	.05	200		484-05	DT2S5	ST-4-05	TC-15	Conv. Cathode Bypass
23	.1	400	30-4527	484-.1	DT4P1	ST-4-1	TC-1	Tuning Cap. Isolation
24	.02	400		484-02	DT4S2	ST-4-02	TC-12	" " "
25	.05	200		484-05	DT2S5	ST-4-05	TC-15	AVC Filter
26	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	Output Grid Bypass
27	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
28	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	IF Coupling
29	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	Osc. Feedback
30	100	500	60-10105407	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
31	33	500	60-00305307					Fixed Trimmer
32	20	500	60-00205307		5R5Q2	MOS.5-42	MS-42	" " " -Cer.
33	470	500	60-10515307	1468-0005	5W5T5	MO.5-35	1FM-35	RF Coupling
34	220	500	60-10205307	1468-0002	5W5T2	MO.5-32	1FM-32	Ext. Ant. Coupling

*Wind same number of turns of wire around replacement as there were on original part.
†Install cardboard insulating tube on replacement capacitor.

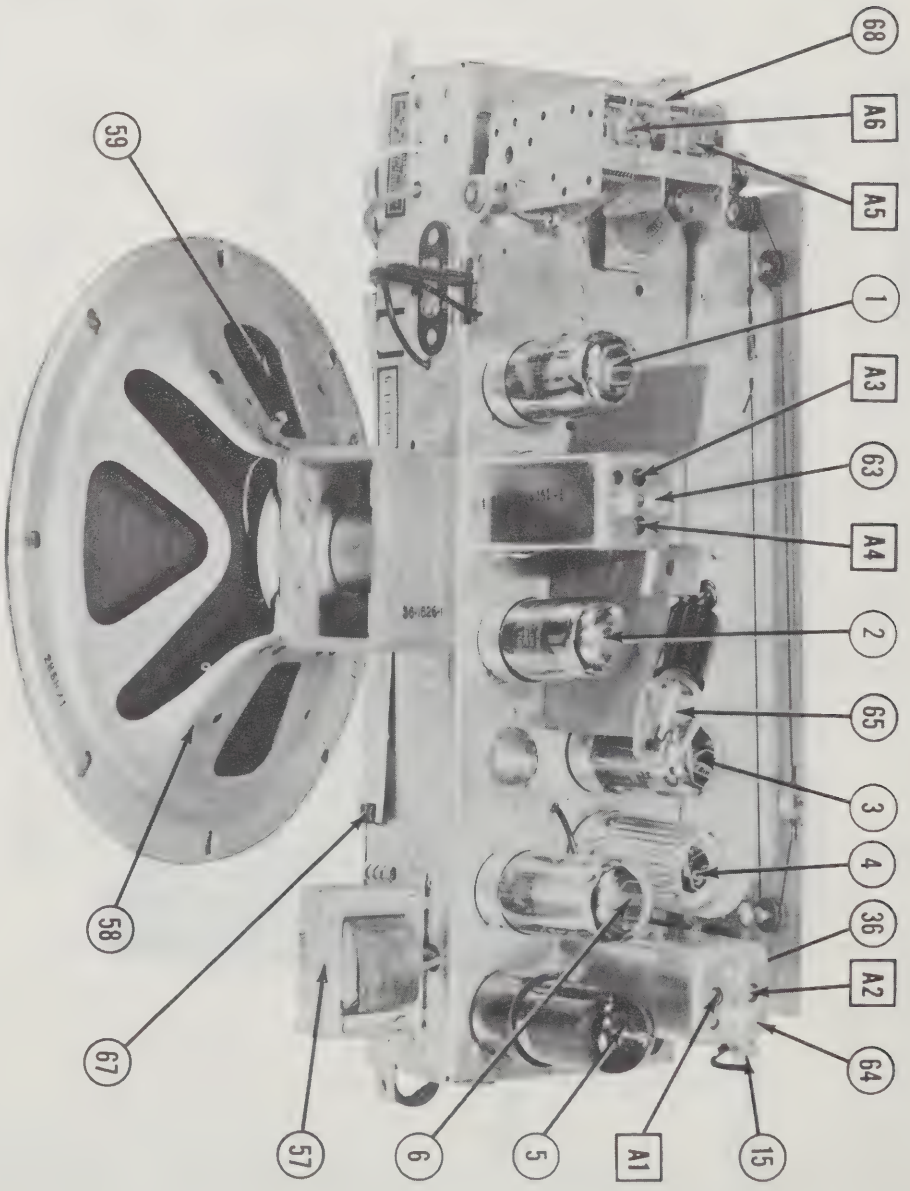
CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
35A	2 Meg.	½	33-5535-15	D18-139X	T-116	Volume Control tapped @ 1 Meg.
B	Shaft		Not Req.	A	Not Req.	Attach to 35A per instructions
36	5 Meg.	½	33-5539-33			Tone Control

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: PHILCO PART No.	IRC PART No.	IDENTIFICATION CODES
37	4700Ω	½	66-2473340	BTS-4700	Yl.-Vi.-Red Ext. Ant. Loading
38	2.2 Meg.	½	66-3223340	BTS-2.2 Meg.	Red-Red-Grn. Conv. Grid
39	2200Ω	½	66-2223340	BTS-2200	Red-Red-Red Conv. Cathode
40	47KΩ	½	66-3473340	BTS-47K	Yl.-Vi.-Or. Osc. Grid
41	18KΩ	½	66-3183340	BTS-18K	Br.-Gray-Or. Osc. Plate
42	18KΩ	½	66-3183340	BTS-18K	Br.-Gray-Or. 1st IF Plate Load
43	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. IF Screen Dropping
44	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. 2nd IF Grid

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	PHILCO PART No.	IRC PART No.	
45	8200Ω	½	66-2823340	BTS-8200	Gray-Red-Red 2nd IF Plate Decoup.
46	2.2 Meg.	½	66-5223340	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
47	470KΩ	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Diode Load
48	10 Meg.	½	66-6103340	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
49	100KΩ	½	66-4103340	BTS-100K	Br.-Blk.-Yl. AF Plate Load
50	220KΩ	½	66-4223340	BTS-220K	Red-Red-Yl. AF Plate Decoupling
51	33KΩ	½	66-3333340	BTS-33K	Or.-Or.-Or. Tone Comp.-See Note
52	470K	½	66-4473340	BTS-470K	Yl.-Vi.-Yl. Output Grid
53	130Ω	½	66-1123340	Bw-½-120	Br.-Or.-Br. Output Cathode
54	8200Ω	1	66-2824340	BTA-8200	Gray-Red-Red Filter
55	500Ω	5	33-3435-3	AB-500	"
56	150KΩ	½	66-4153340	BTS-150K	Br.-Grn.-Yl. Line Isolation

Note-Some models use 68K ½ W. part #66-3683340 in this application.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		PHILCO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
57	4400Ω	3.4Ω	450Ω	.7Ω	32-3242-3	A-3877‡	T22S46‡	A-2002‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
	FIELD	VC IMP.	PHILCO PART No.	JENSEN PART No.	QUAM PART No.	
58	PM	3.4Ω	30-1026-1	ST-115 Mod. P8-5	8A31	
	CONE DIA.	VC DIA.				
59	7-5/16"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	PHILCO PART No.	MEISSNER PART No.	
60	Loop Ant.		0Ω	76-3583-1		
61	Ant. Coil	38.5Ω	.22§ : 1.4Ω	32-4023-1		§Resistance of loop matching tap.
62	Osc. Coil		3Ω	32-4019-6		
63	Input IF	2.2Ω	10Ω	32-4151-1	16-6658	
64	Output IF	10Ω		32-3045-9	16-6670	

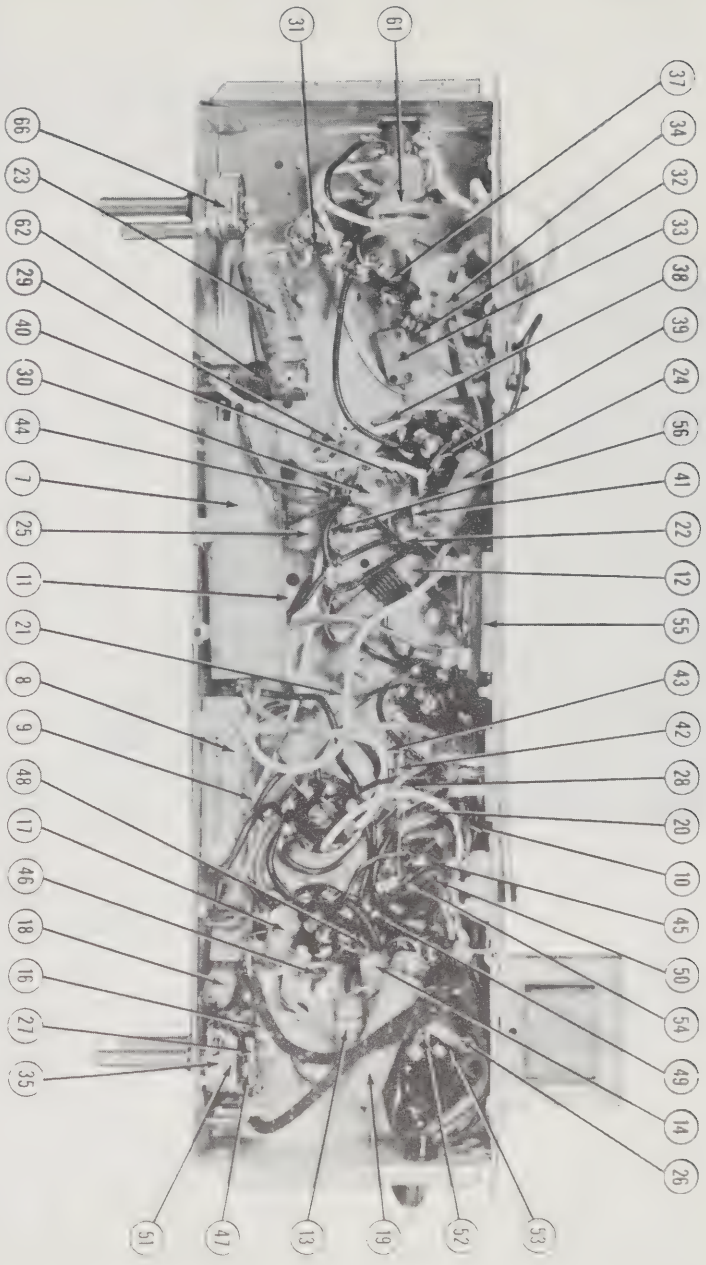
DIAL LIGHT

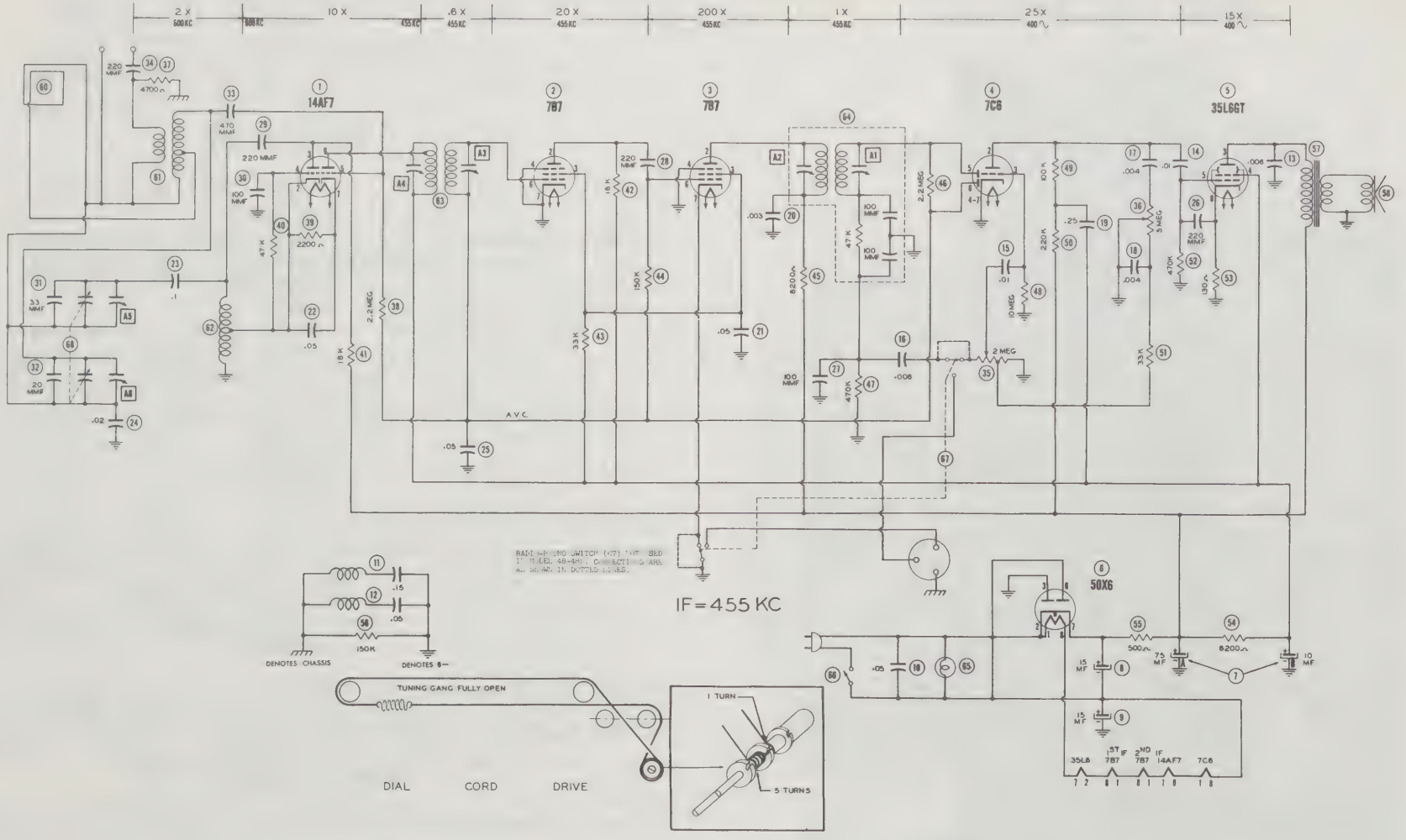
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					PHILCO PART No.		
65	Screw	115-125			34-2477		Type #C7

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
66	Switch	42-1037	On-Off
67	"	42-1860	Radio-Phono (Model 49-1100)
68	2 Gang Var. Cap.	31-2715-1	(34-533MMF, 21-250MMF)
	Dial Scale	27-8004	
	Dial Pointer	58-3[illegible]-3	
	Knob	84-4486	
	Cabinet	10701	(Less Scale)

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14AF7	18VAC)	0V.	95VDC	-7.8VDC§	-2.4VDC	110VDC	3.5VDC	7VAC
2	7B7	25VAC	100VDC	57VDC	0V.	0V.	-.6VDC	0V.	31VAC
3	7B7	18VAC	175VDC	57VDC	0V.	0V.	-.4VDC	0V.	25VAC
4	7C6	7VAC	95VDC	-.6VDC	0V.	-1.8VDC	-.6VDC	0V.	0V.
5	35L6GT	0V.	31VAC	175VDC	110VDC	0V.	0V.	65VAC	8VDC
6	50X6	117VAC	117VAC	0V.	120VDC	175VDC	117VAC	225VDC	65VAC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RADIO-PHONO SWITCH IN RADIO POSITION.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	14AF7	19Ω	.5Ω	110KΩ	47KΩ	2.3 Meg.	150KΩ	2.2KΩ	7Ω
2	7B7	26Ω	170KΩ	180KΩ	0Ω	0Ω	2.7 Meg	.5Ω	30Ω
3	7B7	19Ω	160KΩ	180KΩ	0Ω	0Ω	2.8 Meg.	.5Ω	24Ω
4	7C6	7Ω	470Ω	10 Meg.	0Ω	520KΩ	2.7 Meg.	0Ω	0Ω
5	35L6GT	INF.	32Ω	150KΩ	150KΩ	470KΩ	0Ω	0Ω	13Ω
6	50X6	90Ω	90Ω	0Ω	400KΩ	100KΩ	10Ω	1 K.	90Ω

NOTE—FILAMENTS MEASURED FROM FILAMENT PINS TO JUNCTION OF CAPS. 8 and 9.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

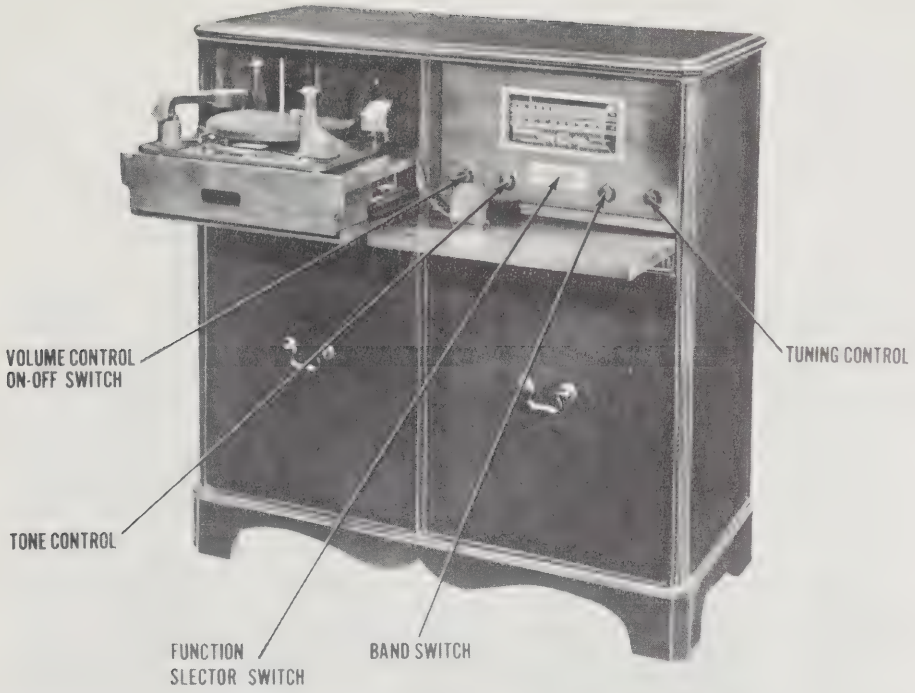
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948

4817-19

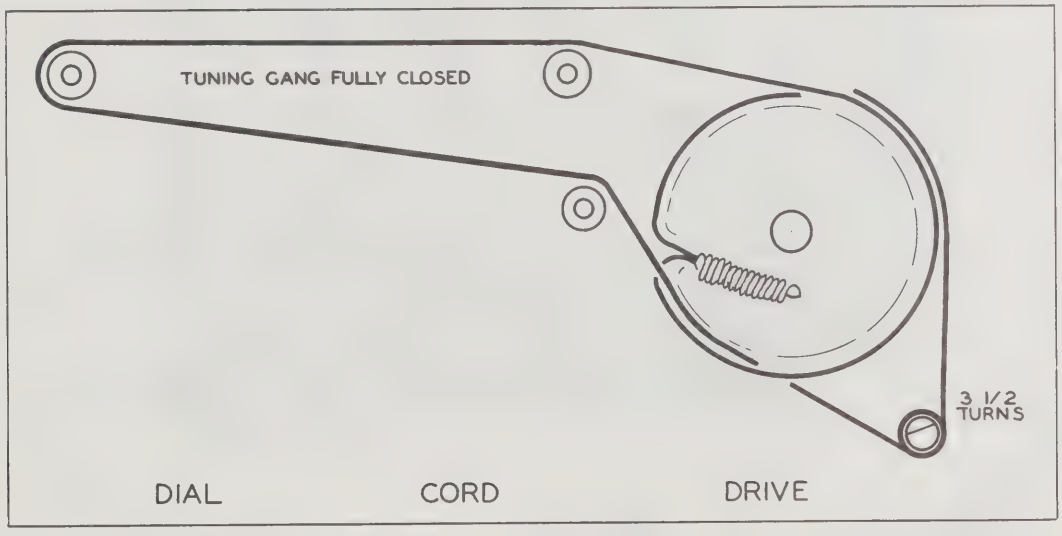
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. **DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.**
2. **Socket connections are shown as bottom views.**
3. **Measured values are from socket pin to common negative.**
4. **Line voltage maintained at 117 volts for voltage readings.**
5. **Nominal tolerance on component values makes possible a variation of + 10% in voltage and resistance readings.**
6. **Volume control at maximum, no signal applied for voltage measurements.**



RECORDIO MODEL 7E40

TRADE NAME	Recordio, Models 7E40, 7E44
MANUFACTURER	Wilcox-Gay Corporation, 604 Seminary St., Charlotte, Mich.
TYPE SET	AC Operated Combination Phono-Recorder-Radio, AM-FM Superheterodyne Receiver
TUBES (TWELVE)	Types, 7B6 FM Conv., 6SA7GT AM Conv., 6BA6 1st IF Amp., 6BA6 FM 2nd IF Amp., 6SJ7GT FM Limiter, 6H6 FM Disc., 6SQ7GT AM Det.-AVC-AF, 6E5 Tuning & Recording Ind., 6J7 Mic. Amp., 6SN7GT AF Amp., 6V6GT Power Output, 5Y3GT Rectifier.
POWER SUPPLY	110-120 Volts AC RATING .75 Amp. @ 117 Volts AC
TUNING RANGE-BROADCAST	540-1600KC FREQ. MOD. 88-108MC



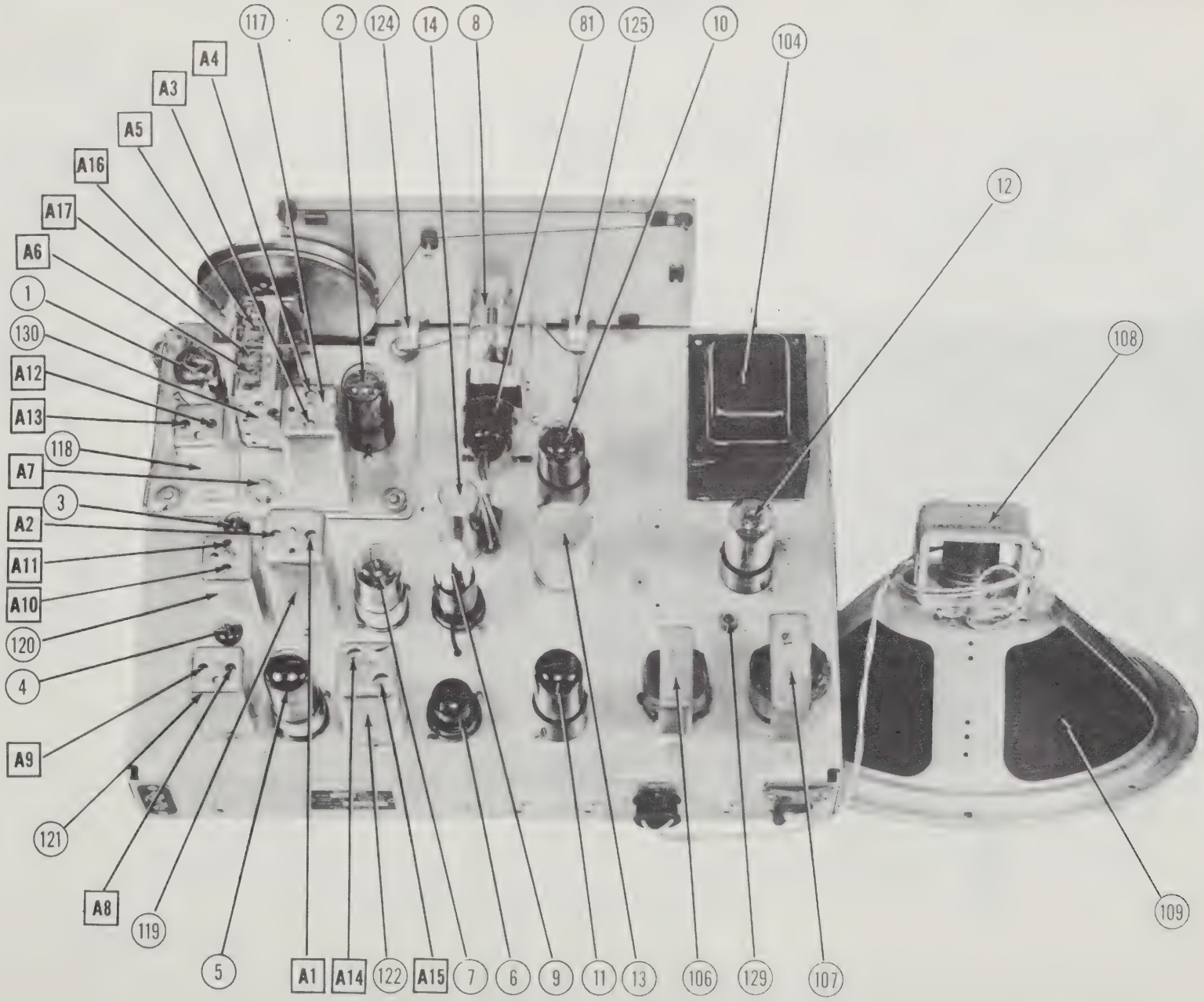
RECORDIO MODELS
7E40, 7E44

RECORDIO MODELS
7E40, 7E44

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 10/48-#4817-20 SET #47-FOLDER #20


117
2
124
14
8
81
125
10
104
12
108
A4
A3
A5
A16
A17
A6
1
130
A12
A13
118
A7
3
A2
A11
A10
120
4
A9
121
A8
119
5
A1
A14
122
A15
7
6
9
11
13
106
129
107
109

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: RECORDIO PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM Conv.	7F8	7F8	8BW	
2	AM Conv.	6SA7GT	6SA7GT	8AD	
3	1st IF Amp.	6BA6	6BA6	7BK	
4	FM 2nd IF Amp.	6BA6	6BA6	7BK	
5	FM Limiter	6SJ7GT	6SJ7GT	8N	
6	FM Discriminator	6H6	6H6	7Q	
7	AM-Det.-AVC-AF	6SQ7GT	6SQ7GT	8Q	
8	Tun. & Rec. Indicator	6E5	6E5	6R	
9	Mic. Amp.	6J7	6J7	7R	
10	AF Amp.	6SN7GT	6SN7GT	8BD	
11	Power Output	6V6GT	6V6GT	7AC	
12	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: RECORDIO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
13A	12	450	18-2040	AF444J4A	UP11145C	DY-402	EL-431	◓ Filter
B	12	450						■ "
C	10	450						▲ Decoupling
D	30	25						■ Cathode Bypass
14A	10	400	18-2040	AF22J4A	UP1145C	DY-2x10-450	EL-202	▲ Decoupling
B	10	400						■ "
C	20	25				M-25-25		Cathode Bypass
15	.01	600		684-01	DT6S1	ST-6-01	TC-11	Line Filter
16	.01	600		684-01	DT6S1	ST-6-01	TC-11	Audio Coupling
17	.005	600		684-005	DT6D5	ST-6-005	TC-25	Tone Comp.
18	.002	600		684-002	DT6D2	ST-6-002	TC-22	" "
19	.05	400		484-05	DT4S5	ST-4-05	TC-15	Audio Coupling
20	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
21	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
22	.01	600		684-01	DT6S1	ST-6-01	TC-11	" "
23	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Mic. Amp. Screen Byp.
24	.1	200		484-.1	DT2P1	ST-2-1	TC-1	Tuning Eye Grid Byp.
25	.1	200		484-.1	DT2P1	ST-2-1	TC-1	Indicator Grid Bypass
26	.01	600		684-01	DT6S1	ST-6-01	TC-11	1st IF Plate Decoup.
27	.1	400		484-.1	DT4P1	ST-4-1	TC-1	RF Byp. Pwr. Supply
28	.01	600		684-01	DT6S1	ST-6-01	TC-11	AM Conv. Screen Byp.
29	.01	600		684-01	DT6S1	ST-6-01	TC-11	RF Coupling
30	.002	600		684-002	DT6D2	ST-6-002	TC-22	De-emphasis
31	.01	600		684-01	DT6S1	ST-6-01	TC-11	2nd IF Plate Bypass
32	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Record Level Diode Filter
33	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Byp.
34	10000	300		484-01	DT4S1	ST-4-01	TC-11	AVC Filter-Cer.
35	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	AM Osc. Grid Cap.
36	100	500		1468-0001	5W5T1	MO.5-31	1FM-31	RF Bypass
37	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Lim. Screen Bypass
38	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	Limiter Grid Filter
39	10000	300		484-01	DT4S1	ST-4-01	TC-11	2nd IF Screen Byp.-Cer.
40	10000	300		484-01	DT4S1	ST-4-01	TC-11	2nd IF Cath. Bypass- "
41	50	500		1468-00005	5W5Q5	MO.5-45	1FM-45	2nd IF Grid Filter
42	10000	300		484-01	DT4S1	ST-4-01	TC-11	1st IF Screen Byp.-Cer.
43	10000	300		484-01	DT4S1	ST-4-01	TC-11	1st IF Cathode Byp.-"
44	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	FM Conv. Plate Decoup.
45	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Coupling-Cer.
46	20	300		1468-00002	5W5Q2	MOS.5-42	MS-42	FM Conv. Cath. Byp.-Cer.
47	500	300		1468-0005	5W5T5	MO.5-35	1FM-35	Osc. Feedback-Cer.
48	50	300		1468-00005	5W5Q5	MO.5-45	1FM-45	FM Osc. Grid Cap.-Cer.
49	500	500		1468-0005	5W5T5	MO.5-35	1FM-35	Filament Bypass
50	250	500		1468-00025	5W5T25	MO.5-325	1FM-325	Tone Compensation

*Items #20 and #89 are combined in one unit and may be obtained under Part #147-1.

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: RECORDIO PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
104	117V AC @ .75A	600V CT @ .095A.	5.2V AC @ 2.0A	6.6V AC @ 4.15A	80-2182	P-6013†	T22R04	P-2952†

†Drill new mounting holes and add series resistor to reduce plate voltage.

FILTER CHOKE

ITEM NO.	RATINGS: TOTAL DIRECT CURRENT	RATINGS: D. C. RESISTANCE	RATINGS: INDUCTANCE (0 CURRENT 1000\)	REPLACEMENT DATA: RECORDIO PART NO.	STANCOR PART NO.	THORDARSON PART NO.	MERIT PART No.	INSTALLATION NOTES
105	.095A	327Ω	10 Henries	14-2101	C-1709	T20053	C-2090‡	‡Drill new mounting holes.

TRANSFORMER (CUTTER)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RECORDIO PART No.	STANCOR PART No.	THORDAR'N PART No.		INSTALLATION NOTES
106	Matched to 6SN7	Matched to cutterhead	845Ω	4500Ω tapped @ 91Ω	81-2108				

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: RECORDIO PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
107	5000Ω	3.7Ω	270Ω	.3Ω	81-2095	A-3824	T22S58	A-2935‡	‡Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: RECORDIO PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
108	FIELD	VC IMP.	WG-64-2091	ST-102#		#Replace output transformer to match 6-8Ω voice coil.
	PM	3.7Ω		Mod. P12-S	12A6#	
109	CONE DIA.	VC DIA.				
	11#"	1"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: RECORDIO PART No.	MEISSNER PART No.
110	BC Loop Ant.		.2Ω		
111	FM Di-pole		.1Ω		
112	Ant. Loading Coil		.2Ω	17-3026-A	
113	Loop Loading Coil		1.4Ω	17-3015-A	
114	FM Ant.Coil	0Ω	0Ω	17-3028	
115	BC Osc.Coil	.3Ω	3.5Ω	17-3023-A	14-1060
116	FM " "		0Ω	17-3029	
117	AM 1st IF	9.3Ω	9.6Ω	68-3001-C	
118	FM 1st IF	1Ω	.9Ω	68-3005-A	
119	AM 2nd IF	10Ω		68-3006-A	
120	FM 2nd IF	.9Ω	.8Ω	68-3005-B	
121	FM 3rd IF	.9Ω	.9Ω	68-3005-A	
122	FM Disc. Trans.	.9Ω	1.2Ω	68-3007-A	
123	Filament Chk		.1Ω	17-3025-A	

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	RECORDIO PART No.	IRC PART No.	CLAROSTAT PART No.	
51A	500KΩ	½	19-2188-1	D13-133	M-60-Z	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 51A per instructions
C	Switch		" "	41	SW-A	" " " " "
52A	250KΩ	½	19-2193	D11-130	M-55-S	Tone Control
B	Shaft		Not Req.	A	Not Req.	Attach to 52A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	RECORDIO PART No.	IRC PART No.	
53	3300Ω	½		BTS-3300	Or.-Or.-Red FM Conv. Cathode
54	2200Ω	½		BTS-2200	Red-Red-Red FM Conv. Plate Decoup.
55	22KΩ	½		BTS-22K	Red-Red-Or. FM Osc. Grid
56	2200Ω	½		BTS-2200	Red-Red-Red FM Osc. Plate
57	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AM Conv. Grid
58	15KΩ	2		BT-2-15K	Br.-Grn.-Or. AM Conv. Screen
59	22KΩ	½		BTS-22K	Red-Red-Or. AM Osc. Grid
60	10KΩ	2		BT-2-10K	Br.-Blk.-Or. Voltage Dropping
61	2200Ω	½		BTS-2200	Red-Red-Red AVC Network
62	68Ω	½			Blue-Gray-Blk. 1st IF Cathode
63	2200Ω	½		BTS-2200	Red-Red-Red 1st IF Screen
64	2200Ω	½		BTS-2200	Red-Red-Red 1st Plate Decoup.
65	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
66	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Diode Load
67	100KΩ	½		BTS-100K	Br.-Blk.-Yl. FM 2nd IF Grid
68	68Ω	½			Blue-Gray-Blk. FM 2nd IF Cathode
69	2200Ω	½		BTS-2200	Red-Red-Red FM 2nd IF Screen
70	2200Ω	½		BTS-2200	Red-Red-Red FM 2nd IF Plate Decoup.
71	18KΩ	2		BT-2-18K	Br.-Gray-Or. Voltage Dropping
72	22KΩ	½		BTS-22K	Red-Red-Or. Limiter Grid
73	22KΩ	½		BTS-22K	Red-Red-Or. " "
74	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. AVC Network
75	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Limiter Screen
76	39KΩ	½		BTS-39K	Or.-White-Or. Limiter Plate Decoup.
77	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Disc. Diode Load
78	100KΩ	½		BTS-100K	Br.-Blk.-Yl. " " "
79	39KΩ	½		BTA-39K	Or.-White-Or. De-emphasis
80	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Record Level Filter-See Note 1
81	1 Meg.	½		BTS-1 Meg.	Br.-Blk.-Grn. Tuning Eye Plate Load
82	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Tone Comp.-See Note 2
83	3.3 Meg.	½		BTS-3.3 Meg.	Or.-Or.-Grn. Tone Comp.
84	1.5 Meg.	½		BTS-1.5 Meg.	Br.-Grn.-Grn. Phono Shunt
85	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue Mic. Amp. Grid
86	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Mic. Amp. Plate Load
87	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Mic. Amp. Screen
88	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Tone Comp.
89	10 Meg.	½		BTS-10 Meg.	1st AF Grid-See Note 3
90	220KΩ	½		BTS-220K	Red-Red-Yl. 1st AF Plate Load
91	47KΩ	½		BTS-47K	Yl.-Vi.-Or. Decoupling
92	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Tone Comp.
93	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. " "
94	680KΩ	½		BTS-680K	Blue-Gray-Yl. 2nd AF Grid
95	3300Ω	½		BTS-3300	Or.-Or.-Red 2nd AF Cathode
96	150KΩ	½		BTS-150K	Br.-Grn.-Yl. 2nd AF Plate Load
97	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Output Grid
98	330Ω	2		BW-2-330	Or.-Or.-Br. Output Cathode
99	10KΩ	½		BTS-10K	Br.-Blk.-Or. Feedback
100	470KΩ	½		BTS-470K	Yl.-Vi.-Yl. Cutter Amp. Grid
101	680Ω	½		BTS-680	Blue-Gray-Br. Cutter Amp. Cathode
102	6.8 Meg.	½		BTS-6.8 Meg.	Blue-Gray-Grn. Record Level Diode Load
103	10Ω	1		BW-1-10	Br.-Blk.-Blk. Series Filament

Note 1-On all chassis with serial numbers below 801,960 a 390KΩ resistor was used. Change to 470KΩ if lack of sensitivity is encountered in the tuning eyes for recording volume.
Note 2-On all chassis with serial numbers below 804,045 an 820KΩ resistor was used. If low phono gain is ecnountered change to 470KΩ.
Note 3-Items #89 and #20 are combined in one unit and may be obtained under Part #147-1.

DATE 10/48-#4817-20 SET #47-FOLDER #20

PARTS LIST AND DESCRIPTIONS (Continued)

DIAL LIGHT

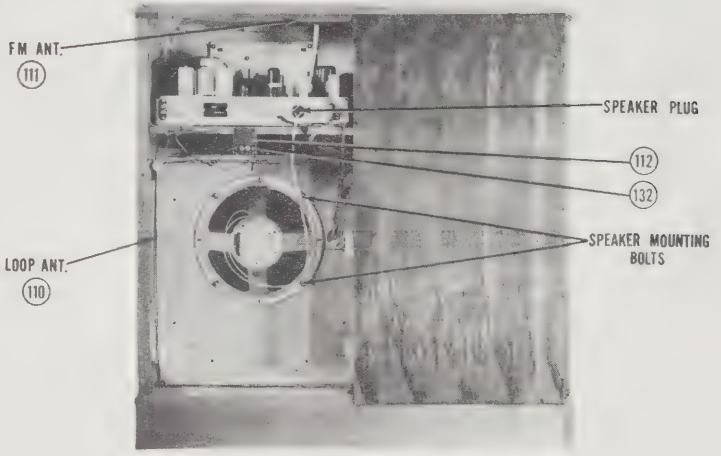
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					RECORDIO PART No.		
124	Bayonet	6-8	0.25	Blue	45-2003		Type 44
125	"	6-8	0.25	"	45-2003		" "

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA		REMARKS
	RECORDIO PART No.	ASTATIC PART No.	
126		X-26	X-26 Original Part

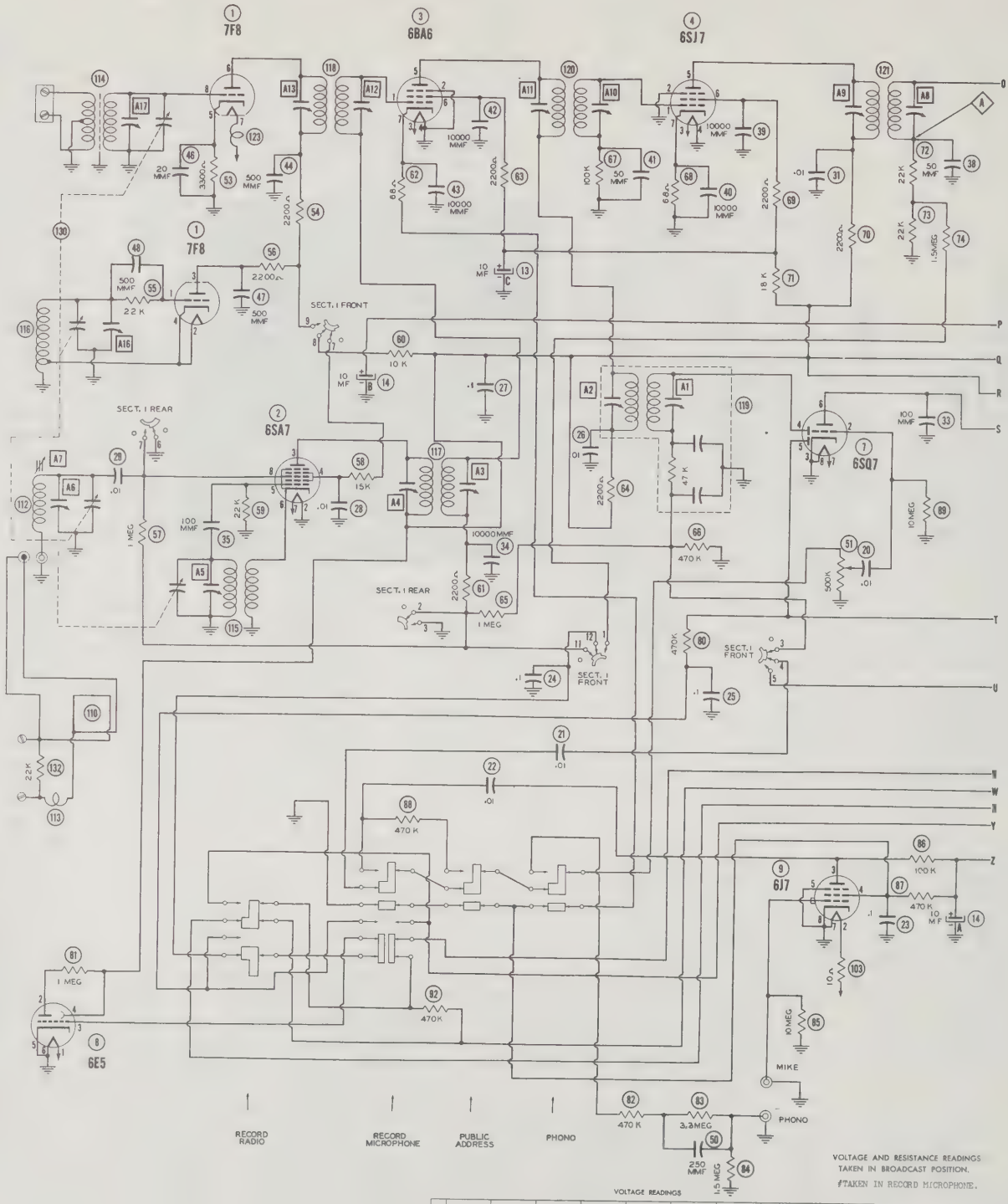
MISCELLANEOUS

ITEM No.	PART NAME	RECORDIO PART No.	NOTES
127	Switch	66-3016	Band
128	"	66-2173	Function
129	Indicator		Volume (Neon)
130	Tuning Gang	77-2096	(65-580MMF, 63-235MMF)
	Dial Scale	56-2221	
	Dial Pointer	39-2022-3	



DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove FM antenna leads from terminal strip on rear of chassis.
3. Remove loop antenna plug from rear of chassis.
4. Remove phono-pickup, speaker, cutter and phono-motor plugs from rear of chassis.
5. Remove four machine screws holding chassis in cabinet. Remove chassis from cabinet.
6. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.

‡TAKEN IN RECORD MICROPHONE.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1	7F8	-2.6VDC§	0V.	160VDC	0V.	2.8VDC	190KΩ	6.6VAC	0V.	-
2	6SA7GT	0V.	0V.	270VDC	80VDC	-8VDC§	0V.	6.6VAC	-.1VDC	-
3	6BA6	-.2VDC	0V.	6.6VAC	0V.	240VDC	120VDC	1VDC	-	-
‡ 4	6BA6	0V.	0V.	6.6VAC	0V.	240VDC	100VDC	1.2VDC	-	-
‡ 5	6SJ7GT	0V.	6.6VAC	0V.	-.6VDC	0V.	50VDC	0V.	25VDC	-
‡ 6	6H6	0V.	6.6VAC	-.4VDC	0V.	-.4VDC	0V.	0V.	0V.	-
7	6SQ7GT	0V.	-.8VDC	0V.	-.6VDC	-.8VDC	85VDC	6.6VAC	0V.	-
8	6E5	-	-	-	-	-	-	-	-	-
9	6J7	0V.	4.3VAC	65VDC	35VDC	0V.	0V.	0V.	0V.	0V.
10	6SN7	0V.	40VDC	1.7VDC	0V.	260VDC	7.2V.A.	6.6VAC	0V.	-
11	6V6GT	0V.	0V.	260VDC	270VDC	0V.	16.5VDC	6.6VAC	15VDC	-
12	5Y3GT	0V.	300VDC	0V.	300VAC	0V.	300VAC	0V.	300VDC	-

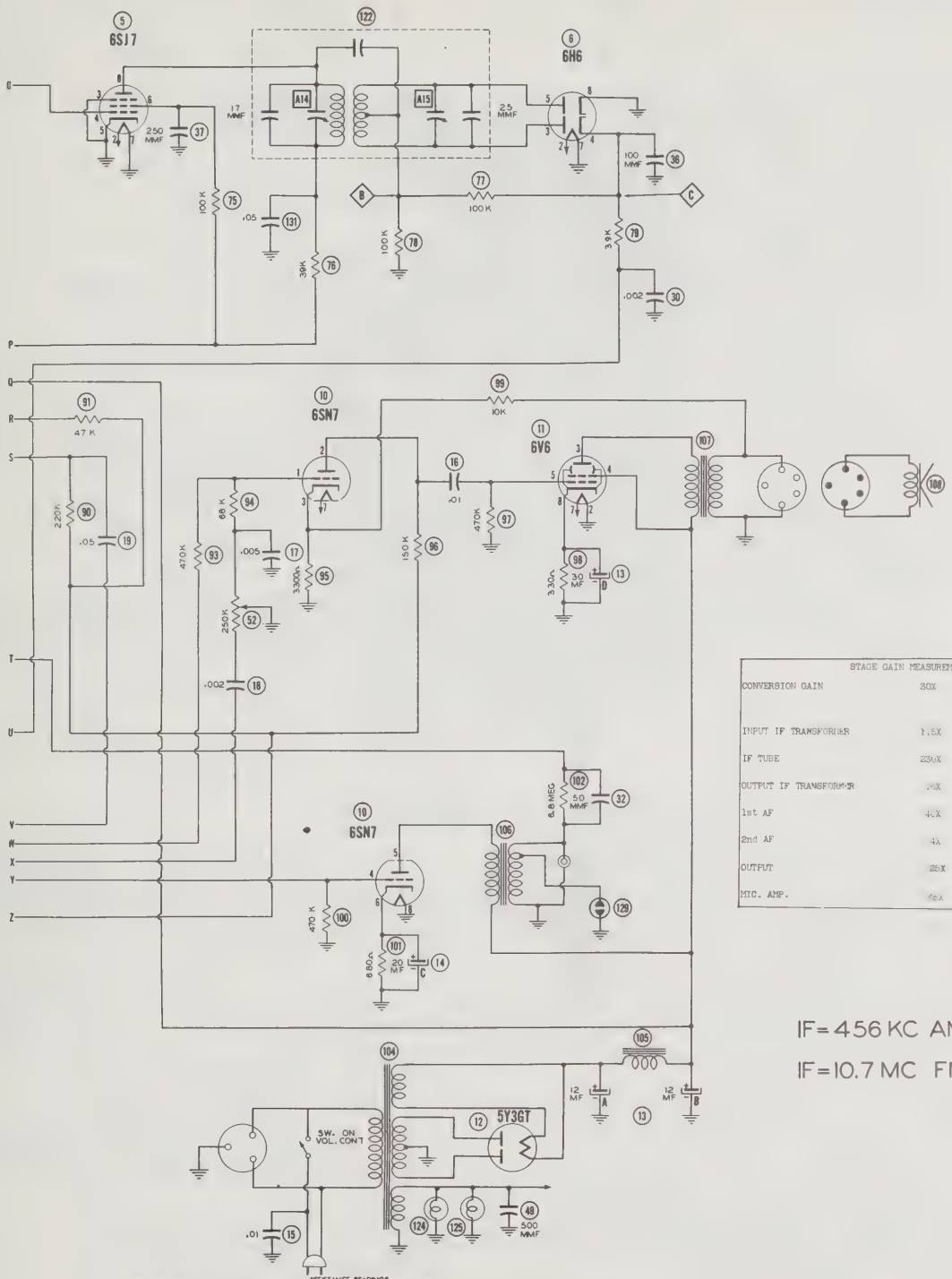
§TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948



STAGE GAIN MEASUREMENTS		
CONVERSION GAIN	30X	IN 60KC OUT 456KC
INPUT IF TRANSFORMER	1.5X	456KC
IF TUBE	230X	45[illegible]
OUTPUT IF TRANSFORMER	[illegible]X	456KC
1st AF	40X	400 [illegible]
2nd AF	4X	4[illegible]
OUTPUT	28X	400 [illegible]
MIC. AMP.	[illegible]X	40K [illegible]

IF = 456 KC AM
IF = 10.7 MC FM

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
‡ 1	7F[illegible]	22KΩ	0Ω	190KΩ	.0Ω	3.3KΩ	190KΩ	.1Ω	0Ω	-
2	6SA7GT	.0[illegible]	0Ω	180KΩ	200Ω	22KΩ	.3[illegible]	.1Ω	2.5 Meg.	-
3	6BA[illegible]	1.5 Meg.	0Ω	.1Ω	0Ω	190K[illegible]	200KΩ	0[illegible]	-	-
‡ 4	6SA6	1.0KΩ	0Ω	.1Ω	0Ω	190KΩ	200KΩ	6MΩ	-	-
‡ 5	6SJ7GT	0Ω	.1Ω	0Ω	44KΩ	0Ω	300KΩ	0Ω	230KΩ	-
‡ 6	6H6	0Ω	.1Ω	190KΩ	2.0KΩ	190KΩ	250KΩ	0Ω	0Ω	-
7	6SQ7GT	0Ω	10 Meg.	0Ω	520KΩ	0.[illegible] Meg.	5[illegible]0KΩ	.1Ω	0Ω	-
8	6E5	-	-	-	-	-	-	-	-	-
# 9	6J7	0Ω	3Ω	300KΩ	700KΩ	0Ω	INF.	0Ω	0[illegible]	10 Meg.
10	6SN7	300KΩ	400KΩ	3.3KΩ	470KΩ	1[illegible]0KΩ	0[illegible]Ω	.1[illegible]	0Ω	-
11	6V6GT	0Ω	0Ω	180KΩ	180KΩ	470KΩ	1[illegible]0KΩ	.1[illegible]	330Ω	-
12	5Y3GT	0Ω	180KΩ	INF.	125Ω	INF.	1[illegible]0Ω	INF.	1[illegible]0KΩ	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1948

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer to last reference mark at low freq. end of dial.
Use an insulated alignment screwdriver for all adjustments.

AM ALIGNMENT

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for all adjustments.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	Direct	High side to large AM stator of tuning cap. Low side to chassis.	456KC	AM (Left radio button depressed)	Tuning cap. fully open.	Across voice coil	A1,A2, A3,A4.	Adjust for maximum output in order given and repeat
2	"	High side to loop socket. Low side to chassis.	1400KC	"	1400KC	"	A5	"
3	"	"	"	"	Tune for maximum output.	"	A6	"
4	"	"	600KC	"	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 2, 3 & 4 until no further improvement can be made.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

If VTVM is not available, a 20,000 ohms per volt DC meter may be used.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	Direct	High side to rear FM stator of tuning cap. Low side to chassis.	10.7MC (Unmodulated)	FM (right) (radio button depressed)	Tuning cap. fully open.	DC probe to Point (A). Common to chassis	A8,A9 A10,A11 A12,A13	Adjust for maximum deflection. Attenuate output of signal generator to maintain a maximum meter reading of 5 volts.
6	Direct	"	"	"	"	DC probe to Point (A). Common to chassis	A14	Adjust for maximum deflection.
7	Direct	"	"	"	"	DC probe to Point (A). Common to chassis	A15	Adjust for zero deflection. Continue with FM-RF alignment in Step 9.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60 ∿ modulation and 450KC sweep. Use 120 ∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
5	.01 MFD	High side to Pin 1 (grid) of 6BA6 1st IF Tube (3). Low side to chassis.	10.7MC (Freq. Modulated)	FM (Right) (Radio button depressed)	Tuning cap. fully open.	Vertical input to Point (A). Ground to chassis.	A8,A9 A10,A11	Adjust for maximum amplitude, symmetry and coincidence of pattern per Fig. 1.
6	.01 MFD	High side to rear FM stator of tuning cap. Low side to chassis.	"	"	"	"	A12, A13	"
7	.01 MFD	"	"	"	"	Vertical input to Point (A). Ground to chassis.	A15	Alternately adjust A14 for maximum amplitude and A15 for maximum straightness of crossover lines with crossover occurring at center of pattern per Fig. 2. Cont. with FM-RF Alignment in Step 9.

FIG. 1

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9	2 - 150Ω carbon res.	Each side in series with 150Ω across FM dipole terminals.	100MC (Unmodulated)	FM	100MC	DC probe to Point (A). Common to chassis	A16	Open A16 completely and then close to first peak. Adjust for maximum deflection.
10	"	"	"	"	Tune for maximum deflection.	"	A17	Adjust for maximum deflection. Reinstall receiver in cabinet.
						OUTPUT METER		
11		Loop	1400KC	BC	Tune for maximum output	Across voice coil	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
12		"	600KC	"	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 11 and 12 until no further improvement can be made.

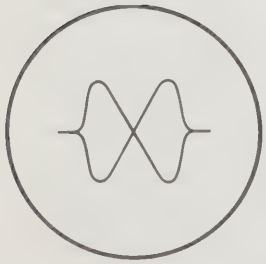
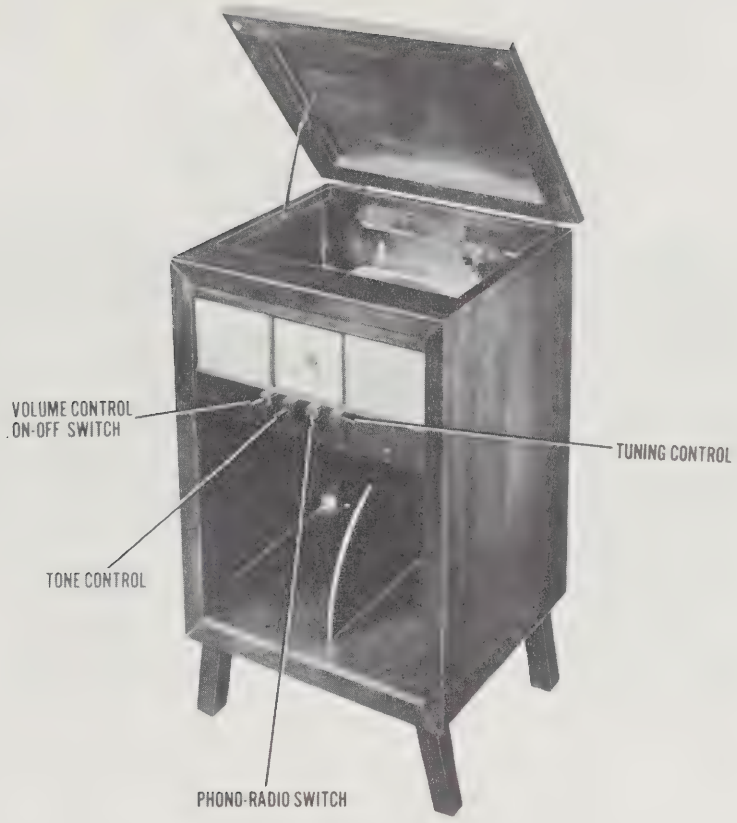


FIG. 2

SONORA
MODEL 401



SONORA MODEL 401

SONORA
MODEL 401

TRADE NAME	Sonora, Model 401
MANUFACTURER	Sonora Radio & Telev. Corp., 325 N. Hoyne Ave., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio, Superheterodyne Receiver with Loop Antenna
TUBES (FIVE)	Types, 12SA7 Converter, 12SK7 IF Amp., 12SQ7 Det.-AVC-AF, 35L6GT Power Output, 35Z5GT Rectifier.
POWER SUPPLY	110-120 Volts AC
TUNING RANGE—BROADCAST	535-1620KC RATING .23 Amp. @ 117 Volts AC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer turn tuning cap. fully closed and set pointer parallel with base of dial. Use isolation transformer if available. If not connect a .1 MFD capacitor in series with low side of signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 8 (grid) of 12SA7. Low side to B-.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output. If isolation transformer is not used reduce dummy ant. to .001 MFD to reduce hum modulation.
2	100MMFD.	High side to external ant. terminal. Low side to ext. ground terminal.	1620KC	"	"	A4	Adjust for maximum output. Reinstall receiver in cabinet.
3	100MMFD.	"	1400KC	Tune for maximum output.	"	A5	Adjust for maximum output.

DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove four hex head machine screws from bottom of chassis mounting board.
3. Remove phono-pickup plug and phono-motor plug from rear of chassis.
4. Remove loop antenna leads from terminals on rear of chassis.
5. Remove mounting board and chassis from cabinet.
6. Remove three hex head screws holding chassis to mounting board. Remove chassis from mounting board.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	12SA7	12SA7	8R	
2	IF Amp.	12SK7	12SK7	8N	
3	Det.-AVC-AF	12SQ7	12SQ7	8Q	
4	Power Output	35L6GT	35L6GT	7AC	
5	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: SONORA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
6A	40	150	N-5051	PRSA150/40-40	EDL4415	DSB-2X40-150	TA-440	Filter-Blue
B	40	150						" -Red
7	.05	400	N-1346	484-05	DT4S5	ST-4-05	TC-15	Rectifier Bypass
8	.05	200	N-1345	484-05	DT2S5	ST-4-05	72P1	Line Isolation
9	.02	600		684-02	DT6S2	ST-6-02	TC-12	Output Plate Bypass
10	.1	400	N-1623	484-.1	DT4P1	ST-4-1	TC-1	Tone Comp.
11	.05	200	N-1345	484-05	DT2S5	ST-4-05	TC15	AF Plate Decoup.
12	.005	600	N-4854	684-005	DT6D5	ST-6-005	TC25	Audio Coupling
13	.08	200		484-075				Phono Isolation
14	.05	200	N-1345	484-05	DT2S5	ST-4-05	TC15	AVC Filter
15A	10000	300	N-1344	484-01	DT4S1	ST-4-01	TC11	Audio Coupling-Cer.-Note
B	250	300	N-6135	1468-00025	5W5T25	MO.5-325	1FM-325	AF Plate Bypass " - "
16	100	500	N-6015	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter-Cer.
17	100	500	N-6015	1468-00C1	5W5T1	MO.5-31	1FM-31	Ant. Isolation-Cer.

Note-In some models Items 15A, 15B, 25A & 25B are combined in one unit, obtainable under Part #N-6477.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
18A	500KΩ	½	N-4843 or	D13-133	AM-60-2	Volume Control
B	Shaft		N-5737	E	KSS-3	Attach to 18A per instructions
C	Switch		Not Req.	41	SW-A	" " " " "
19A	25KΩ	½	N-6157	D16-120		Tone Control
B	Shaft		Not Req.	E		Attach to 19A per instructions

RESISTORS

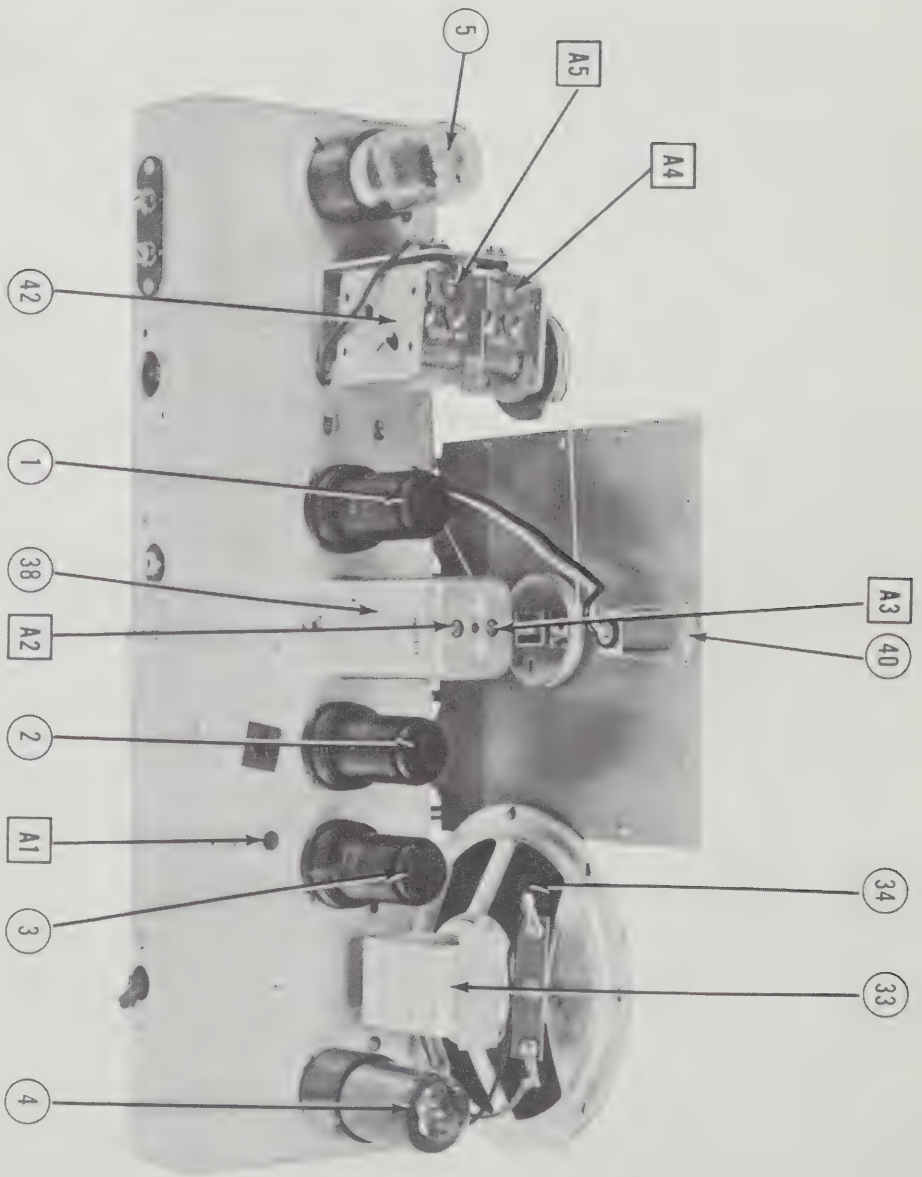
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: SONORA PART No.	IRC PART No.	IDENTIFICATION CODES
20	22KΩ	½	N-4025	BTS-22K	Red-Red-Or. Osc. Grid
21	1 Meg.	½	N-1262	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
22	47KΩ	½	N-4063	BTS-47K	Yl.-Vi.- Or. Diode Filter
23	1 Meg.	½	N-1262	BTS-1 Meg.	Br.-Blk.-Grn. Series Phono
24	6.8 Meg.	½	N-4028	BTS-6.8 Meg.	Blue-Gray-Grn. AF Grid
25A	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. AF Plate Load-See Note
B	470KΩ	½	N-4027	BTS-470K	Yl.-Vi.-Yl. Output Grid-See Note
26	33K	½	N-4064	BTS-33K	Or.-Or.-Or. AF Plate Decoup.
27	180Ω	½	N-4067	BW-½-180	Br.-Gray-Br. Output Cathode
28	1000Ω	1	N-5358	BTA-1000	Br.-Blk.-Red Filter
29	33Ω	½	N-4022	BW-½-33	Or.-Or.-Blk. Surge Limiter
30	82Ω	2	N-4023	BW-2-82	Gray-Red-Blk. Line Dropping
31	220KΩ	½	N-4026	BTS-220K	Red-Red-Yl. Line Isolation

*In some models, Items 15A & 15B and 25A & 25B are combined in one unit, obtainable under Part #N-6477.

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: SONORA PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
32	5600Ω	3.4Ω	300Ω tapped @ 55Ω	.2Ω	N-4875	A-3330		A-3031	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: SONORA PART No.	JENSEN PART No.	GUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-105		
33	PM	3.4Ω	N-6148	Mod. P5-X	5A07	
	CONE DIA.	VC DIA.				
34	4"	9/16"				

R F COILS

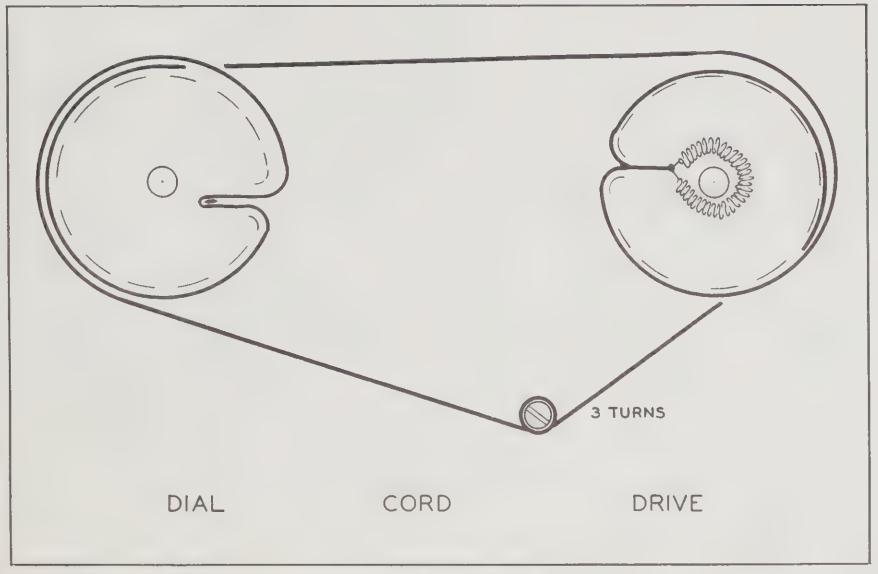
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: SONORA PART No.	MEISSNER PART No.	
35	Loop Ant.		0Ω			
36	Ant.Coil	.8Ω	2.5Ω	N6149		
37	Osc. Coil	.6Ω	6.1Ω	N4810	14-1060	
38	Input IF	21Ω	20Ω	N4813	16-6658	
39	Output IF	29Ω	29Ω	N4846		

DIAL LIGHT

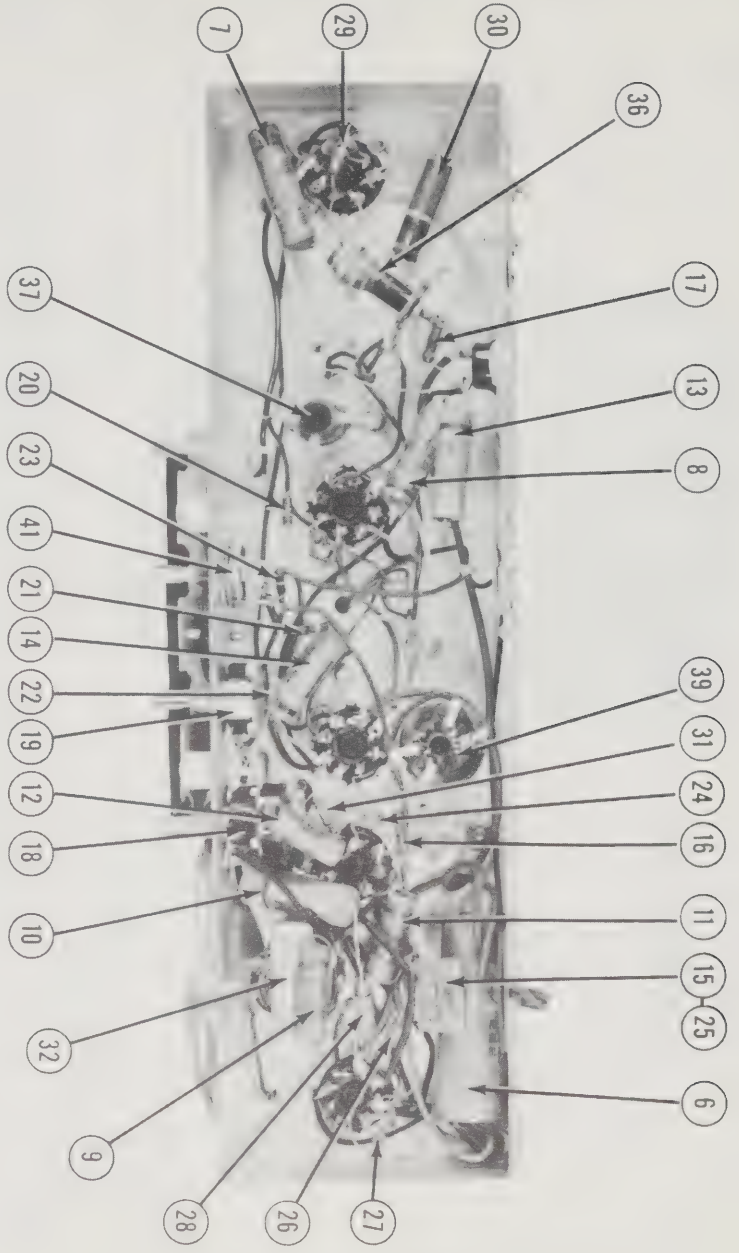
ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: SONORA PART No.		INSTALLATION NOTES
40	Bayonet	6-8	0.15	Brown			Type #47

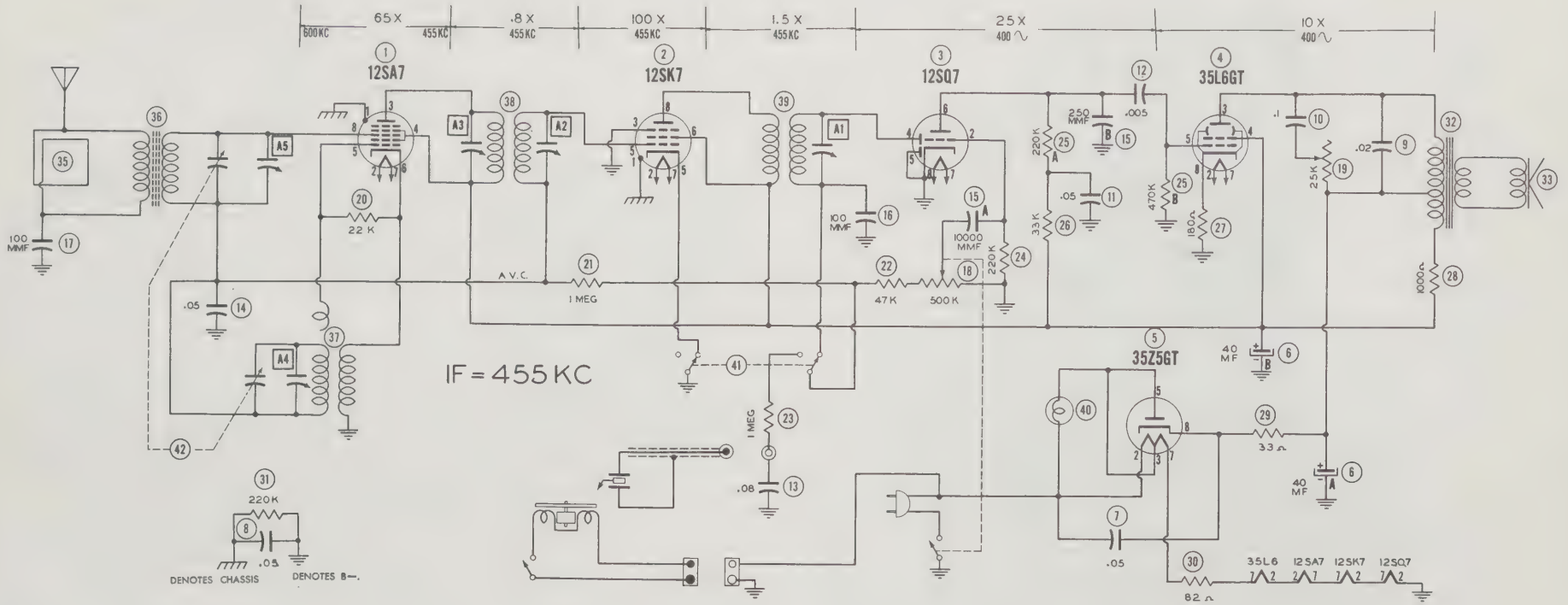
MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
41A	Switch	N-6145	Radio-Phono
B	"	N-6156	Radio Phono (Alternate)
42	2 Gang Var. Cap.	N-6154	(26-386MMF, 35-202MMF)
A1	Trimmer	N-4985	Output IF Adj.



CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

RADIO-PHONO SWITCH IN RADIO POSITION.

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	0V.	39VAC	90VDC	90VDC	-9.6VDC§	0V.	25VAC	-.2VDC
2	12SK7	0V.	1.4VAC	0V.	-.2VDC	0V.	90VDC	.2VAC	.6VDC
3	12SQ7	0V.	0V.	0V.	0V.	-.2VDC	55VDC	12VAC	0V.
4	35L6GT	0V.	39VAC	110VDC	90VDC	0V.	0V.	75VAC	3.5VDC
5	35Z5GT	0V.	117VAC	115VAC	115VAC	115VAC	75VAC	90VAC	120VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
1	12SA7	220KΩ	40Ω	6KΩ	6KΩ	22KΩ	.8Ω	20Ω	1.8 Meg.
2	12SK7	1.2Meg.	13Ω	0Ω	1.8 Meg.	0Ω	6KΩ	20Ω	6KΩ
3	12SQ7	220KΩ	6.8 Meg.	0Ω	0Ω	550KΩ	250KΩ	13Ω	0Ω
4	35L6GT	INF.	40Ω	5KΩ	6KΩ	470KΩ	0Ω	7Ω	1.8Ω
5	35Z5GT	INF.	180Ω	170Ω	5KΩ	170Ω	75Ω	1.4Ω	5KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

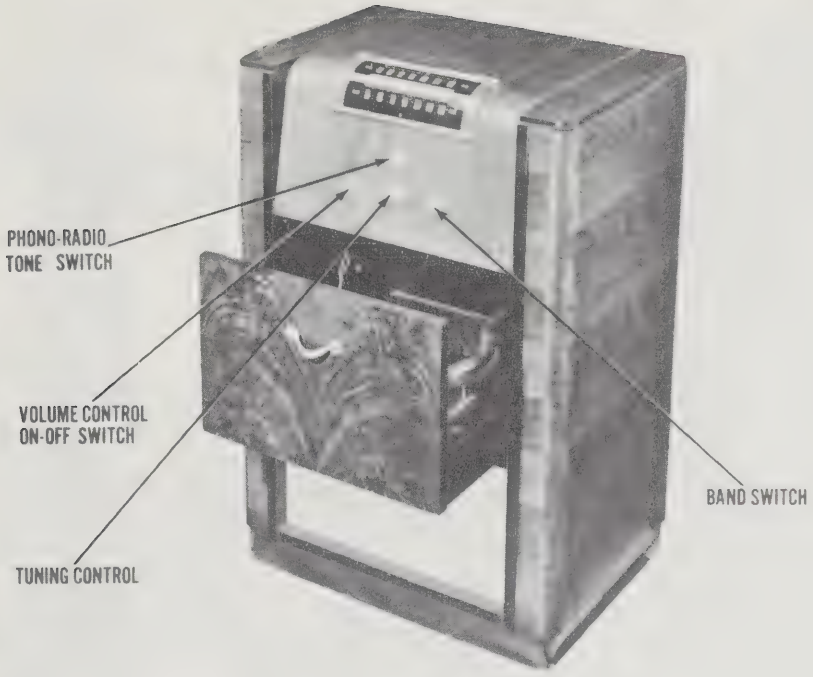
© Howard W. Sams & Co., Inc. 1948

4817-21

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

STEWART-WARNER
MODEL B72CR1 (Code #9038A



STEWART-WARNER
MODEL B72CR1 (Code #9038A

STEWART-WARNER MODEL B72CR1

TRADE NAME	Stewart-Warner, Model B72CR1 (Code 9038A)
MANUFACTURER	Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago, Ill.
TYPE SET	AC Operated Combination Phono-Radio, AM-FM Superheterodyne Receiver
TUBES (SEVEN)	Types, 12BA6 FM RF Amp., 12BE6 Converter, 12BA6 1st IF Amp., 12BA6 FM 2nd IF Amp., 12H6 FM Ratio Det., 12AV6 Det.-AVC-AF, 50B5 Power Output
POWER SUPPLY	105-125 Volts AC — RATING .35 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC — FREQ. MOD. 88-108MC

AM ALIGNMENT

If alignment of both AM & FM channels is required it is necessary to align the AM channel first then the FM channel.

With the tuning cap. fully closed pointer should coincide with last mark below 55 on dial. If it is set incorrectly release pointer clip and reposition pointer.

Remove chassis and loop from cabinet. With tuning cap. still fully closed make a light pencil mark on dial backplate under pointer. Use this reference mark for calibration purposes in following procedure.

Connect ground lead of sig. gen. to B- lug. CAUTION-If your sig. gen. is designed with an AC-DC type of power supply connect ground lead of sig. gen. to B- lug thru a .25 MFD cap.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

Set "phono-radio" and tone switch to "radio-bass" position (extreme counter-clockwise).

Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	200MMFD	High side to Pin 7 (grid) of 12BE6. Low side to B-.	455KC	BC (Counter-clockwise)	Any point of no interference.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output in order given and then repeat.
2	200MMFD	High side to ext. "AM" ant. terminal. Low side to B-.	1500KC	"	4-3/4" from reference mark.	"	A5	Adjust for maximum output
3	200MMFD	"	"	"	Tune for maximum output.	"	A6	" " " "
4	200MMFD	"	600KC	"	"	"	A7	Adjust for maximum output. Try to increase output by detuning A7 and retuning receiver dial until maximum output is obtained. Repeat Steps 2, 3 & 4 until no further improvement can be made.

FOR FM ALIGNMENT SEE PAGE 2 OF THIS FOLDER.

HOWARD W. SAMS & CO., INC. **Indianapolis Indiana**

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 10/48-#4817-22 SET #47-FOLDER #22

FM ALIGNMENT

It is preferable to use an FM sig. gen. and scope for FM alignment; however if this equipment is not available a reasonably accurate alignment may be obtained using a conventional AM sig. gen. and VTVM providing proper care is exercised in adjusting the discriminator circuit trimmer.

If an AM sig. gen. is used it should be capable of producing fundamental frequencies of 10.7 & 88-108MC. Generators which are dependent upon 3rd, 4th or 5th harmonics for frequencies of 88-108MC produce beat signals with local oscillator making alignment difficult.

If alignment of both AM & FM channels is required it is necessary to align the AM channel first then the FM channel.

With chassis in cabinet turn tuning control until dial pointer is at 98MC. Remove chassis and make a light pencil mark under pointer to indicate 98MC calibration point.

Do not attempt to reposition pointer by releasing it from clip as this is done only during AM alignment.

Set receiver volume control to maximum volume position.

Dress FM circuit leads as short and straight as possible, particularly those in the oscillator circuit. I. F. plate and grid should also be kept short and straight.

FM ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

If the internal sawtooth gen. (120 ∿) of the scope is used for horizontal deflection a pattern similar to that of Fig. 1 should be obtained. If the properly phased 60 ∿ sine wave synchronizing voltage from the FM sig. gen. is used for horizontal deflection a pattern similar to that in Fig. 2 should be obtained. Frequency modulate signal with 60 ∿, 300KC deviation.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	SCOPE CONNECT	ADJUST	REMARKS
5	.01 MFD	High side to Pin 7 (grid) of 12BE6. Low side to B- near same tube.	10.7MC (Modulated ± 300KC)	FM (Clockwise)	Any point of non-interference.	Vertical input in series with .1 MFD cap. to Point Ⓐ. Ground to B-.	A8	Adjust A8 for pattern similar to Fig. 1 or Fig. 2 depending upon type of sweep used. (See pre-alignment instructions). Then adjust A8 for maximum amplitude and steepness of that portion of the curve between "A" & "C".
6	.01 MFD	"	"	"	"	"	A9	Adjust until the cross-over Point "B" is centrally located in both the horizontal and vertical directions. In addition the part of the curve between "A" & "C" should be as linear (straight) as possible. Recheck settings of A8 & A9 for greater accuracy.
7	.01 MFD	"	"	"	"	"	A10, A11	Adjust for maximum amplitude and steepness of that portion of the curve between "A" & "C".
8	.01 MFD	"	"	"	"	"	A12, A13	Adjust for maximum amplitude and steepness of that portion of the curve between "A" & "C". If the enlarged pattern now indicates a lack of symmetry readjust A9 for correct crossover point.
9	2-120Ω carbon res.	Each lead in series with 120Ω to ext. FM ant. terminal.	98MC (Modulated ± 300KC)	"	98MC calibration mark (See FM pre-alignment instructions)	"	A14	Adjust for symmetrical pattern. Correct setting of A14 gives centrally located crossover point.
10	"	"	"	"	"	"	A15	Adjust for maximum amplitude of pattern. Recheck A12 & A13 for maximum amplitude and symmetry of pattern.
11	"	"	"	"	"	"	A16	Adjust for maximum amplitude of pattern.
12	Check calibration and tracking of receiver with input signals of 88 & 108MC. If necessary adjust spacing of gang condenser plates.							

FOR AM ALIGNMENT SEE FRONT PAGE OF THIS FOLDER.

FM ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

In Step 6 connect two 68KΩ resistors (within 1% of each other) from Point B to B-. Common lead of VTVM connects to junction of these two resistors which is Point Ⓒ.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5	.01 MFD	High side to Pin 7 (grid) of 12BE6. Low side to B- near same tube.	10.7MC (400 ∿ modulation)	FM (Clockwise)	Any point of non-interference.	DC probe to Point Ⓑ. Common to B-.	A8	Set VTVM to low DC range. Adjust A8 for maximum meter reading (negative).
6	.01 MFD	"	"	"	"	DC probe to Point Ⓑ. Common to Point Ⓒ.	A9	Set VTVM to lowest DC range. As A9 is rotated a point will be found where VTVM will swing sharply from a positive to a negative reading (or vice versa). Adjust A9 for zero voltage as A9 is moved thru this point. Exercise extreme care in this adjustment. Repeat Steps 5 & 6 for greater accuracy. Remove two 68KΩ resistors.
7	.01 MFD	"	"	"	"	DC probe to Point Ⓑ. Common to B -.	A10, A11	Adjust for maximum meter reading.
8	.01 MFD	"	"	"	"	"	A12, A13	"
9	2-120Ω carbon resistor	Each lead in series with 120Ω to ext. FM ant. terminals.	98MC (400 ∿ modulated)	"	98MC calibration mark (See FM pre-alignment instructions)	"	A14	Adjust A14 to receive 98MC signal and adjust for maximum meter reading.
10	"	"	"	"	"	"	A15	Adjust for maximum meter reading. Recheck A12 & A13 for maximum reading.
11	"	"	"	"	"	"	A16	Adjust for maximum meter reading.
	Check calibration and tracking of receiver with input signals of 88 and 108MC. If necessary adjust spacing of gang condenser plates.							

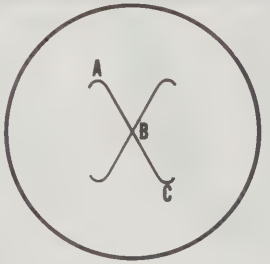


FIG. 1

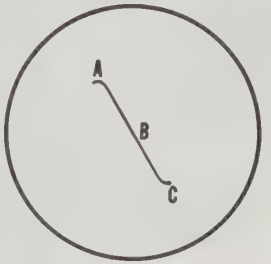
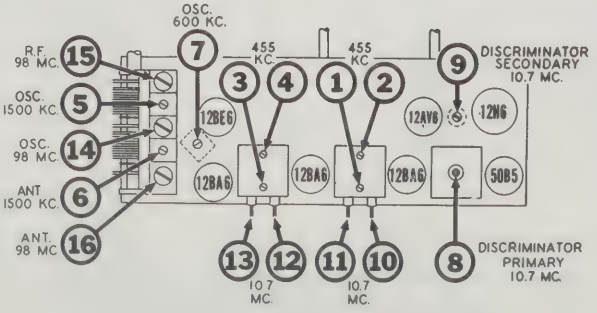


FIG. 2



NUMBER IN CIRCLE CORRESPONDS TO "A" ADJUSTMENT NUMBERS ABOVE

A6
A14
A5
A15
96
2
A4
8
16
17
109
107
36
84
83
A2
90
101
A9
A8
5
91
92
A16
95
111
A7
25
1
A3
93
A13
A12
99
3
100
A11
A10
A1
4
6
7

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	FM RF Amp.	12BA6	12BA6	7BK	
2	Converter	12BE6	12BE6	7CH	
3	1st IF Amp.	12BA6	12BA6	7BK	
4	FM 2nd IF Amp.	12BA6	12BA6	7BK	
5	FM Ratio Det.	12H6	12H6	7Q	
6	Det.-AVC-AF	12AV6	12AV6		
7	Power Output	50B5	50B5	7BZ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STEWART-WAR. PART No.	REPLACEMENT DATA: AEROVOX PART No.	REPLACEMENT DATA: CORNELL-DUBILIER PART No.	REPLACEMENT DATA: SOLAR PART No.	REPLACEMENT DATA: SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
8A	60	150	504980	AF101010D4A	UP5551C	DY-419*	EL452	Filter
B	40	150				U4-20-150		"
C	40	150						"
D	20	25						Decoupling
9	5	50	504937	PRS150-4	BR550		TA-55	Cathode Bypass
10	.02	400	505083	484-02	DT4S2	ST-4-02	TC-12	Stabalizing Cap.
11	.05	400	505073	484-05	DT4S5	ST-4-05	TC-15	Line Filter
12	.05	400	505454				72P1	Rectifier Bypass
13	.01	600		684-01	DT6S1	ST-6-01	TC-11	Line Isolation-See Note
14	.05	150	505028	484-05	DT2S5	ST-4-05	TC-15	Output Plate Bypass
15	.05	200		484-05	DT2S5	ST-4-05	TC-15	Audio Coupling
16	.01	150	504450	484-01	DT2S1	ST-4-01	TC-11	" "
17	.2	400	505071	484-.2	DT4P2	ST-4-2	TC-2	Tone Comp.
18	.2	400	505071	484-.2	DT4P2	ST-4-2	TC-2	Phono Isolation
19	.01	150	504450	484-01	DT2S1	ST-4-01	TC-11	Tone Comp.
20	.02	150	505082	484-02	DT2S2	ST-4-02	TC-12	RF Bypass
21	.05	200		484-05	DT2S5	ST-4-05	TC-15	AVC Filter
22	.05	400	505073	484-05	DT4S5	ST-4-05	TC-15	" "
23	.002	600		684-002	DT6D2	ST-6-002	TC-22	RF Bypass
24	.05	400	505073	484-05	DT4S5	ST-4-05	TC-15	" "
25	.02	200		484-02	DT2S2	ST-4-02	TC-12	AVC Filter
26	.1	400		484-.1	DT4P1	ST-4-1	TC-1	Ant. Isolation
27	.05	200		484-05	DT2S5	ST-4-05	TC-15	1st IF Decoupling
28	22	500	504973	1468-000025	5W5Q25	MO.5-425	1FM-45	1st IF Cathode Bypass
29	100	350	505025	1468-0001	5W5T1	MO.5-31	1FM-31	Feedback-Cer.
30	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	AF Plate Bypass-Cer.
31	2000	150	504977	1467-002	1W5D2	MW.5-22	1FM-22	RF Bypass-Cer.
32	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	Audio Coupling-Cer.
33	1700	150		1467-0015	1W5D15	MW.5-215	1FM-215	RF Bypass-Cer.
34	1500	150	504976	1467-0015	1W5D15	MW.5-215	1FM-215	Fil. Bypass-Cer.
35	100	350	505025	1469-0001	5R5T1	MO8.5-31	MS-31	De-emphasis-Cer.
36	5000	150	504978	1467-005	1D5D5	MW.5-25	1FM-25	Diode Load Cap.-Cer.
37	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	Tone Comp.-Cer.
38	5000	150	504978	1467-005	1D5D5	MW.5-25	1FM-25	RF Byp. Pwr. Supply-Cer.
39	1500	150	504976	1467-0015	1W5D15	MW.5-215	1FM-215	2nd IF Decoupling-Cer.
40	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	2nd IF Fil. Bypass-Cer.
41	150	350	505026	1468-00015	5W5T15	MO.5-315	1FM-315	RF Bypass-Cer.
42	150	350	505026	1468-00015	5W5T15	MO.5-315	1FM-315	Diode RF Filter-Cer.
43	5000	150	504978	1467-005	1D5D5	MW.5-25	1FM-25	Diode RF Filter-Cer.
44	1500	150	504976	1467-0015	1W5D15	MW.5-215	1FM-215	AVC Filter-Cer.
45	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	Fil. Bypass-Cer.
46	22	500	504973	1468-000025	5W5Q25	MO.5-425	1FM-42	RF Bypass-Cer.
47	3	500	504730					Conv. Cathode Byp.-Cer.
48	33	350	505072		5R5Q3	MO8.5-47		Osc. Feedback-Cer.
49	47	500	504974	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap.-Cer.
50	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	" " " "
51	470	350	504975	1468-0005	5W5T5	MO.5-35	1FM-31	Osc. Feedback-Cer.
52	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	RF Bypass-Cer.
53	10000	150	504979	1467-01	1D3S1	MW.3-11	1FM-11	Osc. Feedback-Cer.
54	10	500	502295	1468-00001	5W5Q1	MO.5-41	1FM-41	RF Byp. Pwr. Supply-Cer.
55	15	500	505053	1468-00001	5W5Q1	MO.5-41	1FM-41	RF Coupling-Cer.
56	47	350	504975	1467-005	5W5T5	MO.5-35	1FM-31	" " "
57	100	350	505025	1468-0001	5W5T1	MO.5-31	1FM-31	RF Screen Bypass-Cer.
								RF Cathode Bypass-Cer.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS: FIELD	RATINGS: VC IMP.	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: JENSEN PART No.	REPLACEMENT DATA: QUAM PART No.	INSTALLATION NOTES
91	PM	8.2Ω	503342	ST-117 Mod. PM-T	8A31	
	CONE DIA.	VC DIA.				
	7-3/4"	1.1"				

R F COILS

ITEM No.	USE	DC RES.: PRI.	DC RES.: SEC.	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA: MEISSNER PART No.	
93	Loop Ant.	.5Ω	2Ω	505054		
94	FM Dipole					
95	FM Ant.Coil	0Ω	0Ω	505062		
96	FM RF Coil		0Ω	505060		
97	AM Osc.Coil		5Ω	505042		
98	FM Osc.Coil		0Ω	505060		
99A	1st IF AM	18Ω	19Ω†	505066		†Total resistance of both secondaries.
B	" " FM	1.5Ω				
100A	2nd IF AM	18Ω‡	15.5	505067		‡Total resistance of both primaries.
B	" " FM		.5Ω			
101	FM Det.Trans	1.5Ω	.5Ω	5050301		
102	RF Plate Choke		0Ω	505075		
103	Conv. Grid Choke		0Ω	505076		
104	Conv. Cath. Choke		0Ω	505076		
105	Fil. Choke		1Ω	5050302		
106	" "		1Ω	5050302		

DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA: STEWART-WARNER PART No.	REPLACEMENT DATA	INSTALLATION NOTES
107	Bayonet	115V			506183		Type #C7

MISCELLANEOUS

ITEM No.	PART NAME	STEWART-WARNER PART No.	NOTES
108	Switch	504838	Band
109	"	506185	Radio-Phono-Tone
110	Rectifier	504972	Selenium
111	Tuning Gang	504955	(14-461MMF, 14-461MMF)
A5	Trimmer	119491	BC Osc. Adj.
A6	"	504069	BC Ant. Adj.
A7	Padder	505051	BC Osc. Adj.
A14	Trimmer	504954	FM Osc. Adj.
A15	"	504954	FM RF Adj.
A16	"	504954	FM Ant. Adj.
	Dial Scale	506191	
	Dial Pointer	502690	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA STEWART-WARNER PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5	1500	150	504976	1467-0015	1W5D15	MM.5-215	1FM-215	F11. Bypass-Cer.
6	47	500	504974	1468-00005	5W5Q5	M0.5-45	1FM-45	RF Coupling-Cer.
7	470	500	504.7	1467-0005	5W5D	M0.-3	1FM-	RF Bypass-Cer.

*Parallel sections to obtain desired capacity.
See Note-This is special inductive cap. resonant at 455KC. Do not substitute ordinary capacitor.

CONTROLS

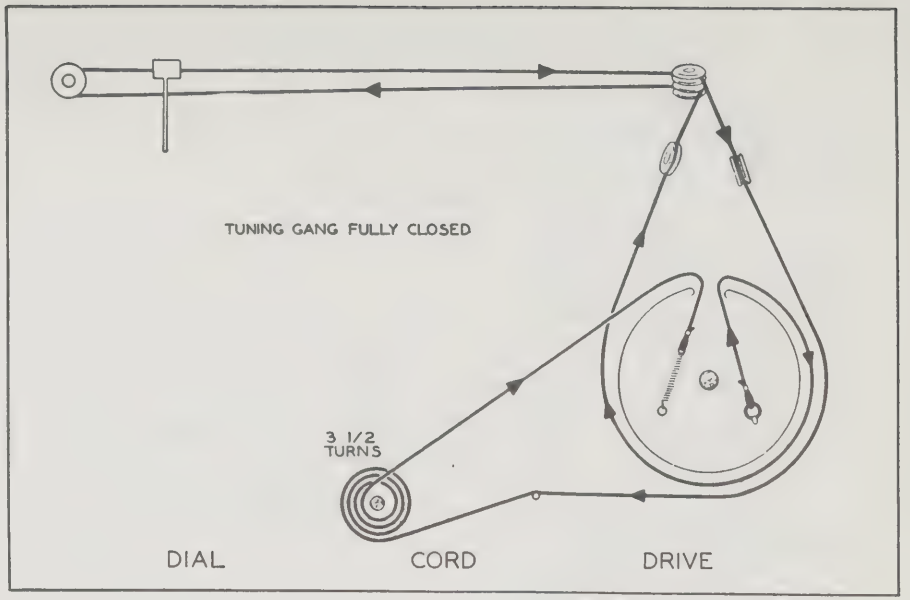
ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEWART-W. PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
61A	1 Me..	½	504967	D13-137	AM-63-Z	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 61A per instructions
C	Switch		" "	41	SW-A	" " " " "

RESISTORS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEWART-WARNER PART No.	IRC PART No.	IDENTIFICATION CODES
62	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. FM RF Grid
63	68Ω	½	502794		Blue-Gray-Blk. FM RF Cathode
64	33Ω	½	504969		Or.-Or.-Blk. Parasitic Supp.
65	22KΩ	½	502130	BTS-22K	Red-Red-Or. Osc. Grid
66	1500Ω	½	502406	BTS-1500	Br.-Grn.-Red Conv. Screen
67	68Ω	½	502794		Blue-Gray-Blk. 1st IF Cathode
68	680Ω	½	502287	BTS-680	Blue-Gray-Br. 1st IF Decoup.
69	33KΩ	½	504710	BTS-33K	Or.-Or.-Or. Diode Filter
70	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. AVC Network
71	1 Meg.	½	502268	BTS-1 Meg.	Br.-Blk.-Grn. AVC Network
72	10Ω	½	504968		Br.-Blk.-Blk. 2nd IF Cathode
73	680Ω	½	502287	BTS-680	Blue-Gray-Br. 2nd IF Decoup.
74	33KΩ	½	504710	BTS-33K	Or.-Or.-Or. De-emphasis
75	68KΩ	½	502408	BTS-68K	Blue-Gray-Or. Ratio Det. Load
76	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. AVC Network
77	10 Meg.	½	502136	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
78	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
79	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. Output Grid
80	150Ω	½	504437	BW-½-150	Br.-Grn.-Br. Output Cathode
81	2.2 Meg.	½	502135	BTS-2.2 Meg.	Red-Red-Grn. Delayed AVC Network
82	100KΩ	½	502132	BTS-100K	Br.-Blk.-Yl. Tone Comp.
83	68KΩ	½	502408	BTS-68K	Blue-Gray-Or. " "
84	100KΩ	½	510073	BTS-100K	Br.-Blk.-Yl. Series Phono
85	2200Ω	½	504971	BTS-2200	Red-Red-Red Decoupling
86	470Ω	2	504970	BT-2-470	Yl.-Vi.-Br. Filter
87	33Ω	1	505023	BW-1-33	Or.-Or.-Blk. Surge Limiter
88	220KΩ	½	502133	BTS-220K	Red-Red-Yl. Line Isolation
89	470KΩ	½	502134	BTS-470K	Yl.-Vi.-Yl. AVC Network

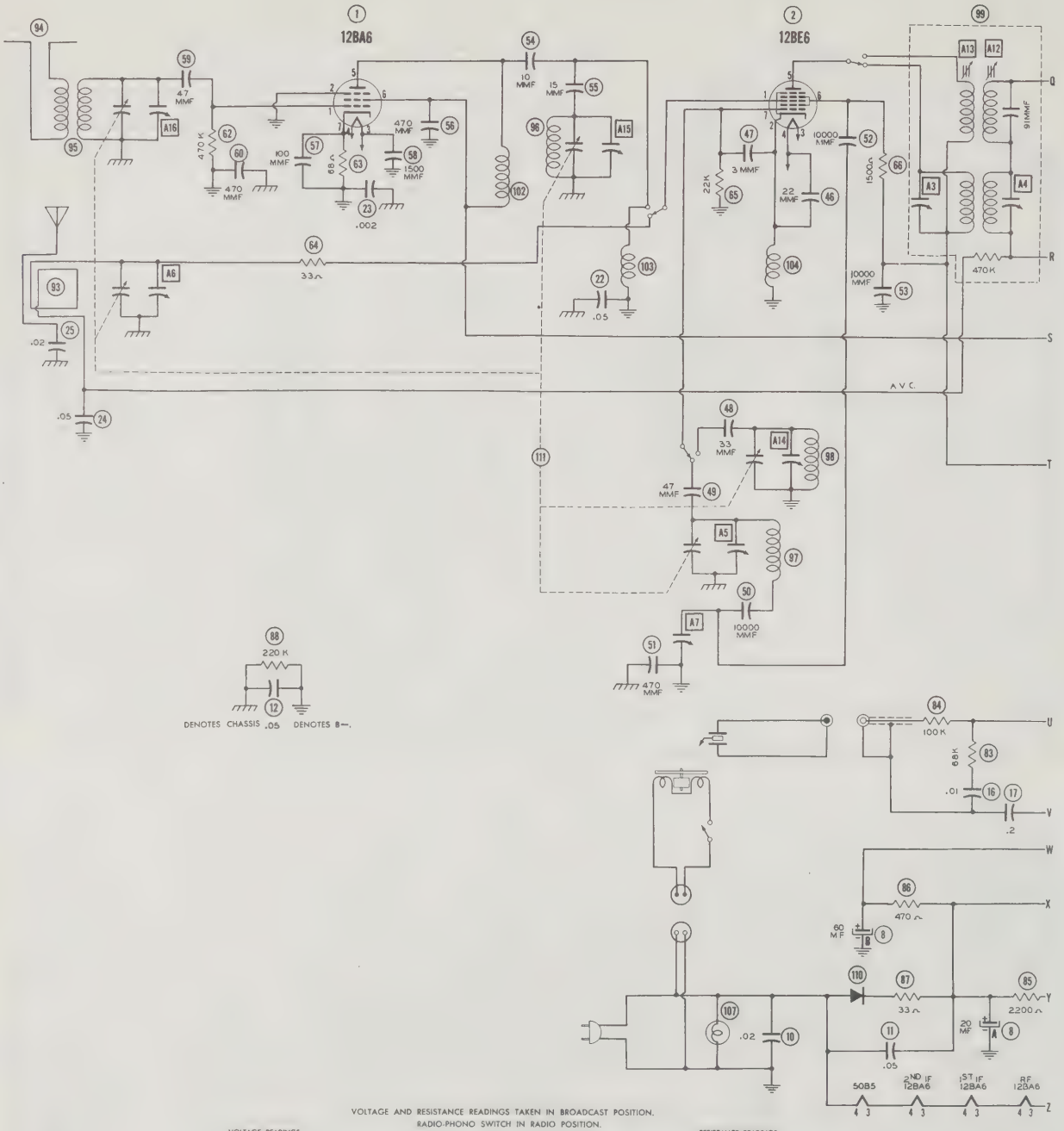
TRANSFORMER (OUTPUT)

ITEM No.	RATING IMPEDANCE PRI.	RATING IMPEDANCE SEC.	RATING DC RES. PRI.	RATING DC RES. SEC.	REPLACEMENT DATA STEWART-WARNER PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
90	17500Ω	3.5Ω	[illegible]	[illegible]	[illegible]	A-[illegible]	[illegible]	[illegible]	



DISASSEMBLY INSTRUCTIONS

1. Remove four push-on type control knobs.
2. Remove FM antenna leads from terminals on rear of loop antenna.
3. Remove two wood screws holding loop antenna in cabinet.
4. Remove speaker leads from speaker.
5. Disconnect phono-pickup and motor plugs.
6. Remove two hex head screws holding chassis in cabinet. Remove chassis and loop from cabinet.
7. Remove four hex nuts holding speaker in cabinet. Remove speaker from cabinet.



VOLTAGE AND RESISTANCE READINGS TAKEN IN BROADCAST POSITION.
RADIO-PHONO SWITCH IN RADIO POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	12BA6	-.1VDC	0V.	48VAC	37VAC	110VDC	110VDC	.6VDC	-
2	12BE6	-4.4VDC§	0V.	37VAC	24VAC	100VDC	90VDC	-.2VDC	-
3	12BA6	-.2VDC	0V.	48VAC	55VAC	95VDC	95VDC	1VDC	-
‡ 4	12BA6	-.5VDC	0V.	55VAC	65VAC	100VDC	100VDC	.2VDC	-
‡ 5	12H6	0V.	13VAC	-1VDC	0V.	0V.	0V.	24VAC	0V.
6	12AV6	-.4VDC	0V.	0V.	13VAC	-.4VDC	-.4VDC	65VDC	-
7	50B5	0V.	6.4VDC	65VAC	117VAC	120VDC	100VDC	.3VDC	-

§TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

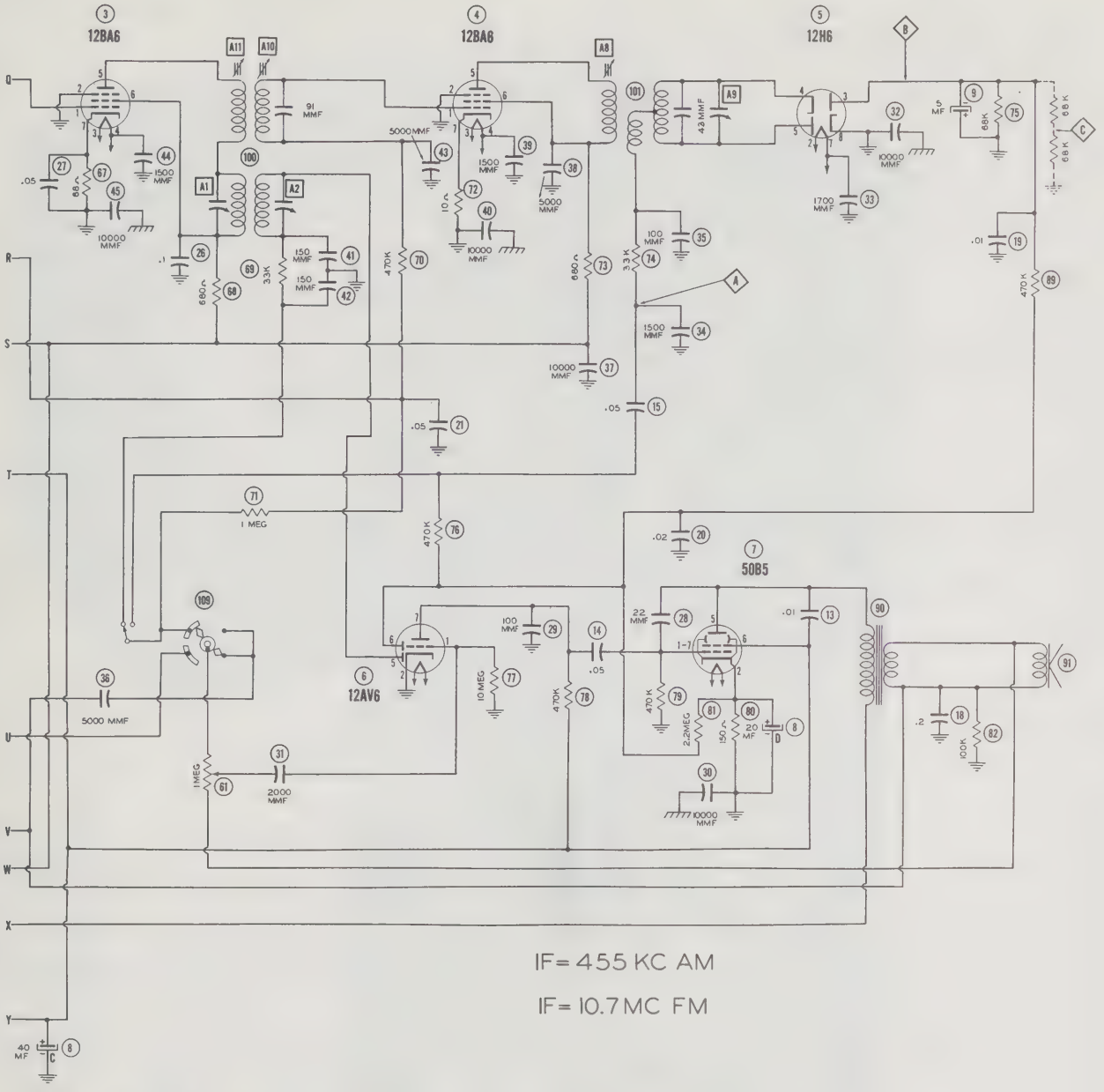
Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
‡ 1	12BA6	470KΩ	0Ω	12KΩ	3KΩ	0Ω	2KΩ	0Ω	-
2	12BE6	22KΩ	0Ω	3KΩ	.5KΩ	3KΩ	34KΩ	2.5 MegΩ	-
3	12BA6	2.1 Meg.	0Ω	42KΩ	0Ω	2KΩ	2KΩ	0Ω	-
‡ 4	12BA6	2.6 Meg.	0Ω	50Ω	54Ω	30KΩ	30KΩ	1KΩ	-
‡ 5	12H6	INF.	13Ω	0KΩ	INF.	INF.	0Ω	0Ω	0Ω
6	12AV6	10 Meg.	0Ω	0Ω	13Ω	1.1 Meg.	2.5KΩ	500KΩ	-
7	50B5	470KΩ	150Ω	54Ω	40Ω	30KΩ	32KΩ	47KΩ	-

‡ VOLTAGE AND RESISTANCE READINGS TAKEN IN FM POSITION.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

1. DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1948

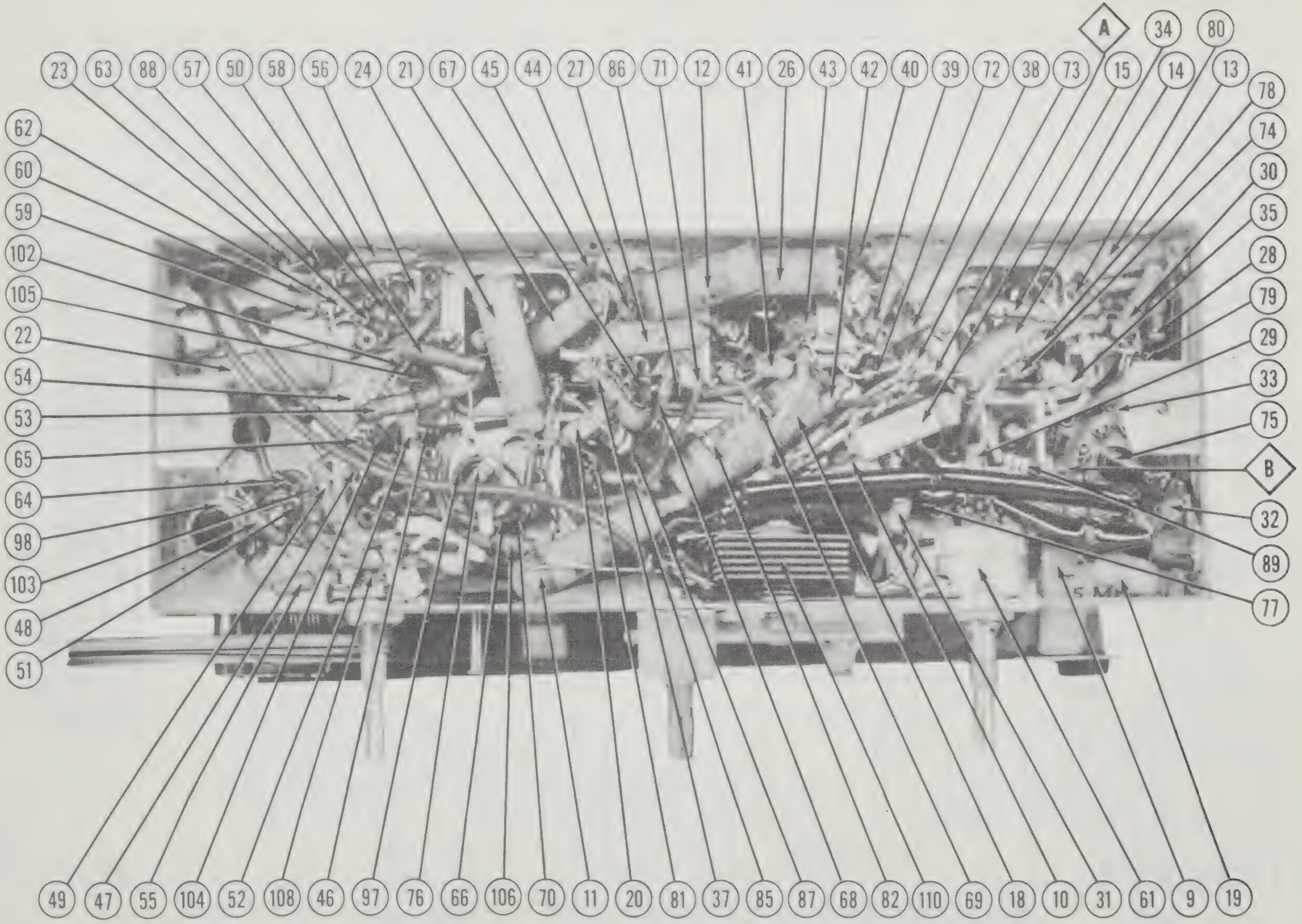


STAGE GAIN MEASUREMENTS		
CONVERSION GAIN	35X	IN 600KC OUT 455KC
INPUT IF	.8X	455KC
IF TUBE	180X	455KC
OUTPUT IF	.5X	455KC
AUDIO	30X	400 ~
OUTPUT	25X	400 ~

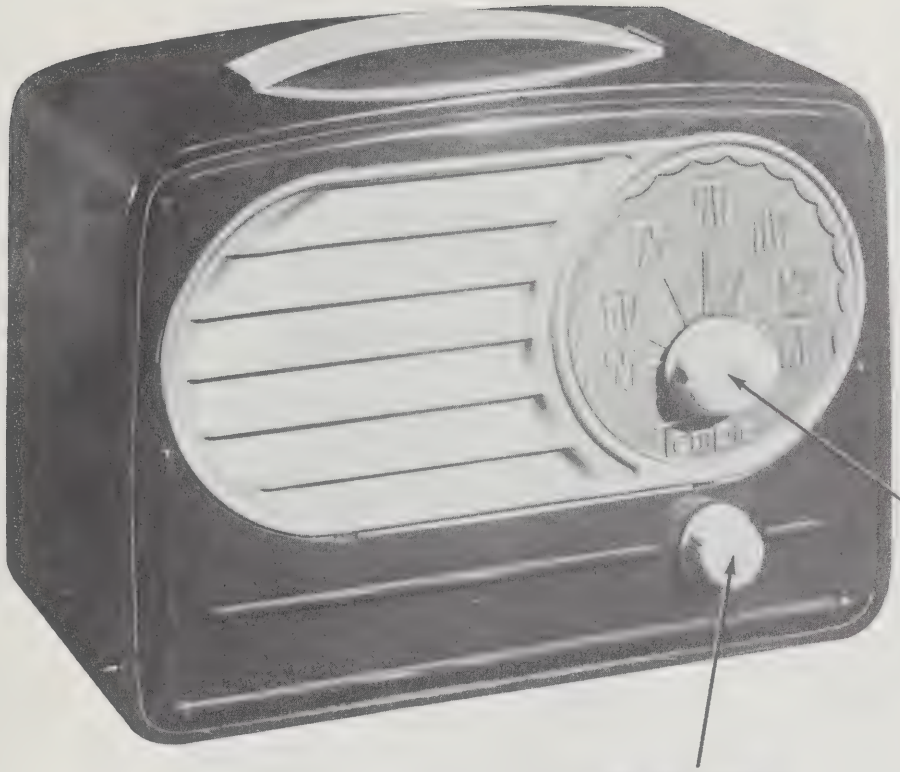
The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative and 3-volt battery bias substituted for measurement.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1948


A
B
23
63
88
57
50
58
56
24
21
67
45
44
27
86
71
12
41
26
43
42
40
39
72
38
73
15
14
34
13
80
78
74
30
35
28
79
29
33
75
32
89
77
62
60
59
102
105
22
54
53
65
64
98
103
48
51
49
47
55
104
52
108
46
97
76
66
106
70
11
20
81
37
85
87
68
82
110
69
18
10
31
61
9
19

TEMPLE MODEL H-411
BATTERY OPERATED



TEMPLE MODEL H-411
BATTERY OPERATED

TEMPLE MODEL H-411

TRADE NAME	Temple Model H-411
MANUFACTURER	Templetone Radio Mfg. Corp., Garfield Ave., New London, Conn.
TYPE SET	Battery Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1L4 IF Amp., 1H5GT Det.-AVC-AF, 3Q5GT Power Output.
POWER SUPPLY RATING	1.5 Volts "A" Supply and 67.5 Volts "B" Supply 250 MA @ 1.5 Volts DC and 12.5 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	540-1700KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.01 MFD	High side to large stator of tuning cap. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2, A3	Adjust for maximum output.
2		Loop	1700KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3		"	1550KC	Tune for maximum output.	"	A5	Adjust for maximum output.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
"Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

DATE 10/47-#4817-23 SET #47-FOLDER #23

PARTS LIST AND DESCRIPTIONS

TEMPLE MODEL H-411

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TEMPLE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1L4	1L4	6AR	
3	Det.-AVC-AF	1H5GT	1H5GT	5Z	
4	Power Output	3Q5GT	3Q5GT	7AP	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TEMPLE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
5	5	100		PRS150-4	BR415	M-8-150	UT-41	Power Supply Bypass
6	.001	600		684-001	DT6D1	ST-6-001	TC-21	Output Plate Bypass
7	.003	600		684-003	DT6D3	ST-6-003	TC-23	Audio Coupling
8	.005	400		484-005	DT6D5	ST-6-005	TC-25	" "
9	.05	200		484-05	DT2S5	ST-4-05	TC-15	AVC Filter
10	150	500		1468-00015	5W5T15	M0.5-315	1FM-315	Output Grid Bypass*
11	150	500		1468-00015	5W5T15	M0.5-315	1FM-315	Diode RF Filter
12	470	500		1468-0005	5W5T5	M0.5-35	1FM-35	RF Bypass
13	22	500		1468-000025	5W5Q25	M0.5-425	1FM-425	IF Coupling
14	68	500						Fixed Trimmer
15	50	300		1468-00005	5W5Q5	M0.5-45	1FM-45	Osc. Grid Cpl.-Cer.

*Not used in all models.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TEMPLE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
16A	2 Meg.	½	RP-19	D13-139	AM-83-S	Volume Control
B	Shaft		Not Req.	E	KSS-3	Attach to 16A per instructions
C	Switch		" "	42	SW-A2	" " " " "

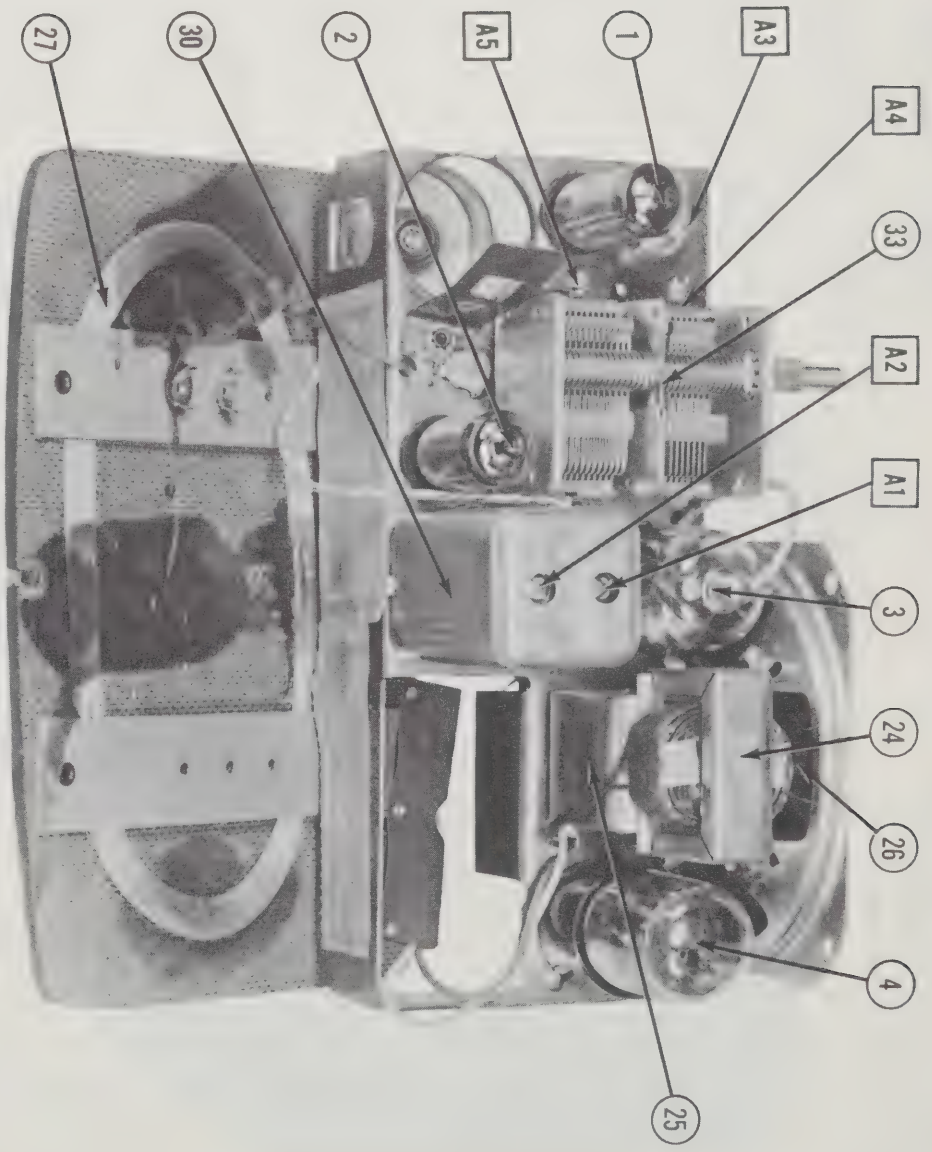
RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TEMPLE PART No.	IRC PART No.	IDENTIFICATION CODES
17	100KΩ	½		BTS-100K	Br.-Blk.-Yl. Osc. Grid
18	39KΩ	½		BTS-39K	Or.-White-Or. Bias
19	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. IF Grid
20	3.9 Meg.	½		BTS-3.9 Meg.	Or.-White-Grn. AVC Network
21	10 Meg.	½		BTS-10 Meg.	Br.-Blk.-Blue AF Grid
22	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. AF Plate Load
23	2.2 Meg.	½		BTS-2.2 Meg.	Red-Red-Grn. Output Grid

TRANSFORMER (OUTPUT)

ITEM No.	RATING: IMPEDANCE PRI.	RATING: IMPEDANCE SEC.	RATING: DC RES. PRI.	RATING: DC RES. SEC.	REPLACEMENT DATA: TEMPLE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	INSTALLATION NOTES
24	6600Ω	3.0Ω	550Ω	.7Ω	TA-13398	A-3329‡	T22S47‡	A-2900‡	‡Bend mounting tabs down, file out slots and mount on original bracket.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA: TEMPLE PART No.	JENSEN PART No.	QUAM PART No.	INSTALLATION NOTES
	FIELD	VC IMP.		ST-113		
25	PM	3.0Ω	EH-23	Mod. P4-X	4A07	
	CONE DIA.	VC DIA.				
26	4"	9/16"				

R F COILS

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: TEMPLE PART No.	MEISSNER PART No.	
27	Loop Ant.		6Ω			
28	Osc. Coil	1.5Ω	6Ω			
29	Input IF	10Ω				
30	Output IF	20Ω	24Ω		16-5714	

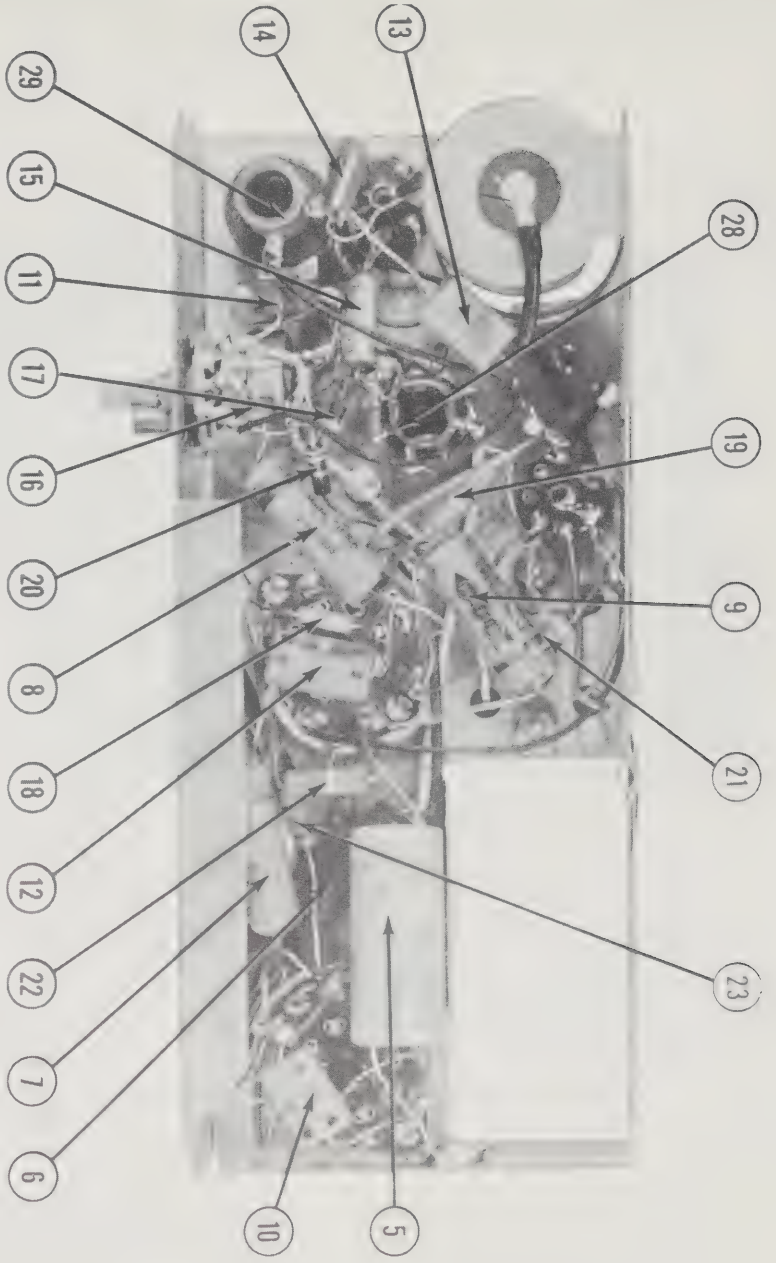
BATTERIES

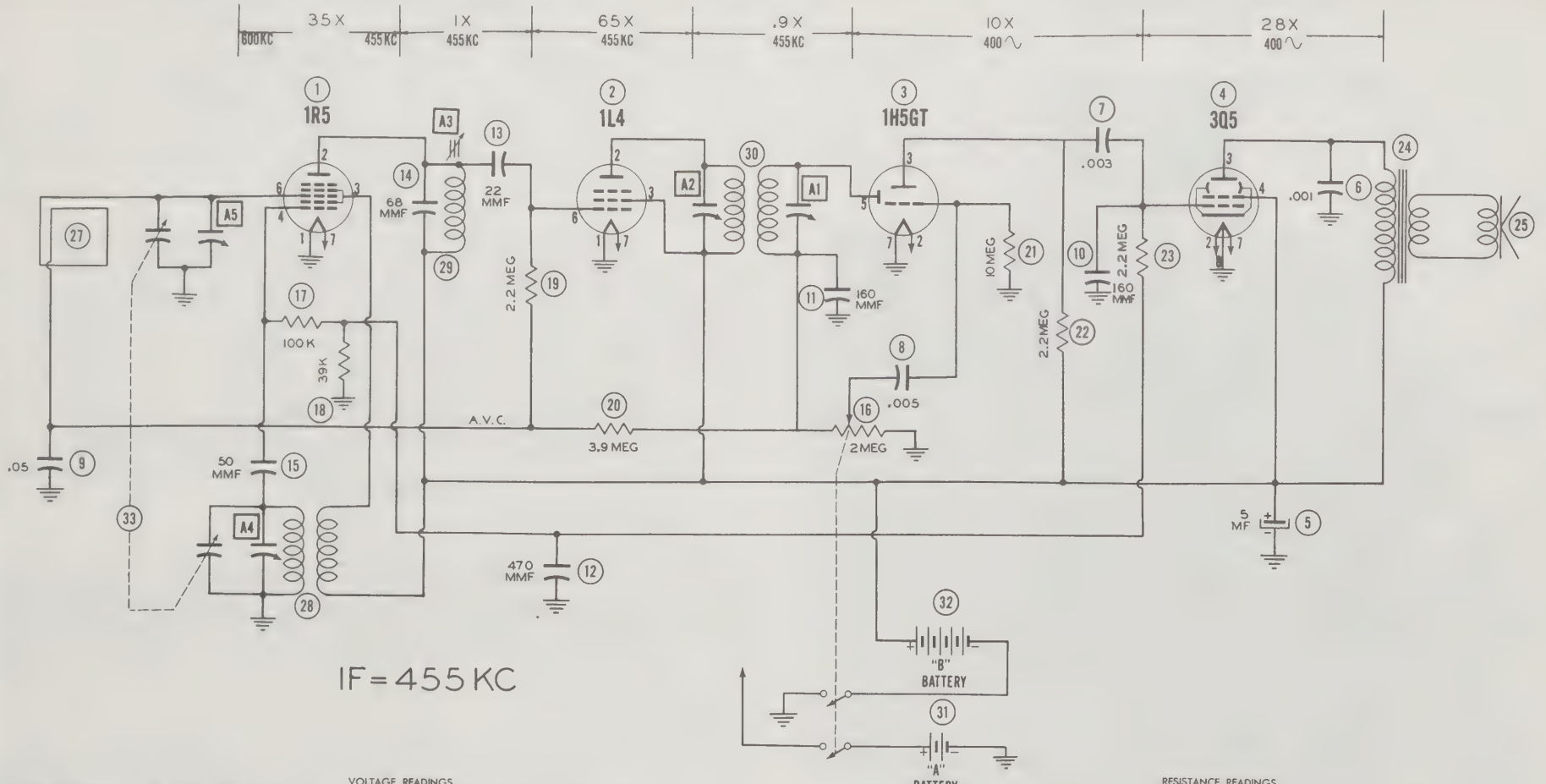
ITEM No.	VOLTAGE	TEMPLE PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
31	1.5 V"A"	GB3	950			2R			
32	67.5V"B"	GB5			467		XX45		

MISCELLANEOUS

ITEM No.	PART NAME	TEMPLE PART No.	NOTES
33	2 Gang Var. Cap.		(23-150MMF, 17-447MMF)

CHASSIS—BOTTOM VIEW





VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1R5	0V.	60VDC	60VDC	-8.6VDC§	0V.	0V.	1.5VDC	-	-
2	1L4	0V.	60VDC	60VDC	0V.	0V.	0V.	1.5VDC	-	-
3	1H5GT	60VDC	1.5VDC	40VDC	-.6VDC	-.2VDC	0V.	0V.	0V.	0V.
4	3Q5GT	0V.	1.5VDC	55VDC	60VDC	-.2VDC	0V.	1.5VDC	0V.	-

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Cap
1	1R5	0Ω	70KΩ	70KΩ	140KΩ	0Ω	2.7 Meg.	*	-	-
2	1L4	0Ω	70KΩ	70KΩ	INF.	0Ω	8.5 Meg.	*	-	-
3	1H5GT	70KΩ	*	2.2 Meg.	40KΩ	2 Meg.	INF.	0Ω	10 Meg.	10 Meg.
4	3Q5GT	INF.	*	70KΩ	70KΩ	2.2 Meg.	INF.	*	0Ω	-

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

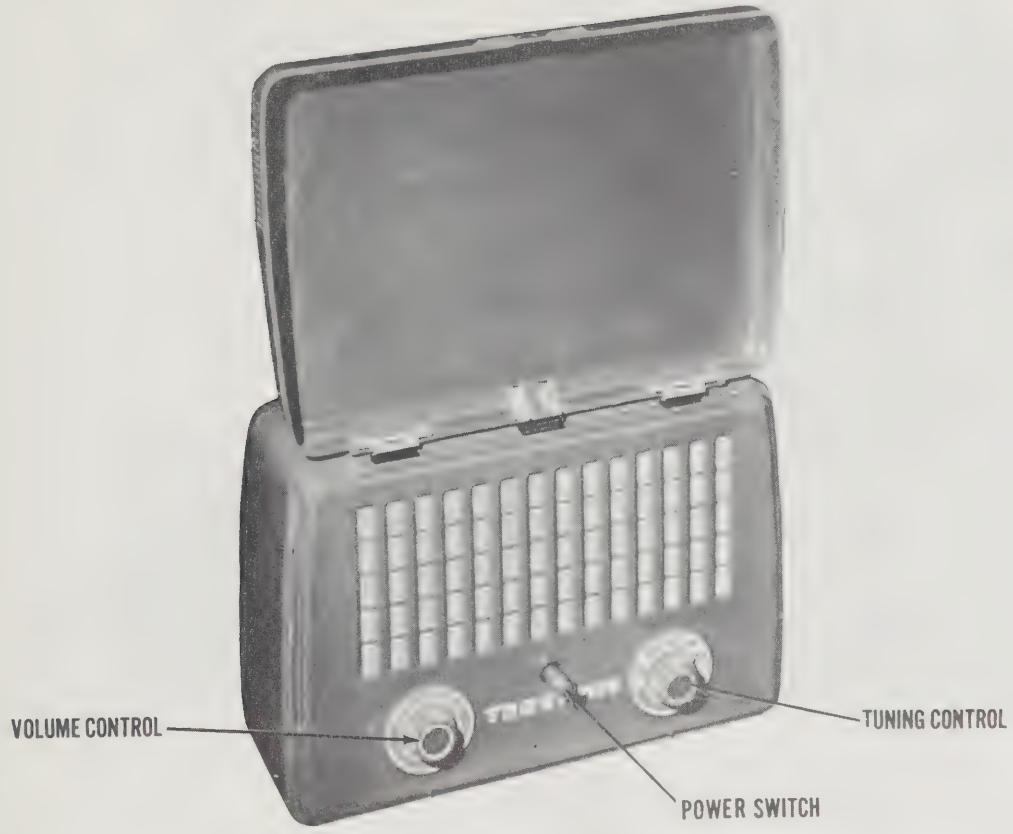
©Howard W. Sams & Co., Inc. 1948

4817-23

The [illegible] measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to chassis.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
5 - Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL D3811
(Fact. #114BXH) BATTERY-LINE OPERATED



TRUETONE MODEL D3811

TRADE NAME	Truetone, Model D3811 (Fact. No. 114BXH)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Three Power Operated Portable Superheterodyne Receiver with Loop Antenna
TUBES (FOUR)	Types, 1R5 Converter, 1U4 IF Amp., 1S5 Det.-AVC-AF, 3Q4 Power Output.
POWER SUPPLY	105-125 Volts AC-DC or 6 Volts "A" Supply and 67.5 Volts "B" Supply
RATING	.1 Amp. @ 117 Volts AC or 57.5MA @ 6 Volts DC and 6.5MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	545-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power when available. If AC power is used, use an isolation transformer when available. If not, connect a .1 MFD capacitor in series with low side of the signal generator and B-.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.1 MFD.	High side to Pin 6 (grid) of 1R5. Low side to chassis.	455KC	Tuning cap. fully open.	Across voice coil	A1,A2	Adjust for maximum output. If AC power is used without an isolation transformer reduce dummy ant. to 200 MMF. to reduce hum modulation.
2	.1 MFD	"	"	"	"	A3,A4	Adjust for maximum output.
3	250MMFD	"	1600KC	"	"	A5	" " " "
4		Loop	1400KC	Tune for maximum output.	"	A6	" " " "
5		"	600KC	"	"	A7	Rock tuning cap. and adjust for maximum output. Repeat Steps 3, 4 & 5 until no further improvement can be made.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D3-11

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA		RMA BASE TYPE	INSTALLATION NOTES
		TRUETONE PART No.	STANDARD REPLACEMENT		
1	Converter	1R5	1R5	7AT	
2	IF Amp.	1U4	1U4	6AR	
3	Det.-AVC-AF	1S5	1S5	6AU	
4	Power Output	3Q4	3Q4	7BA	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA					IDENTIFICATION CODES AND INSTALLATION NOTES
	CAP.	VOLT	TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	
5A	40	150	A16-282		UP7DJ53		D14560	Filter
B	20	150						"
C	20	150						"
D	100	25						Filament Bypass
6	.05	400	A16-172	484-05	DT4S5	ST-4-05	TC-15	Line Filter
7	.05	400	A16-172	484-05	DT4S5	ST-4-05	72P1	Line Isolation
8	.002	200	A16-182	484-002	DT6D2	ST-6-002	TC-22	Output Plate Bypass
9	.005	150	A16-181	484-005	DT6D5	ST-6-005	TC-25	Audio Coupling
10	.005	150	A16-181	484-005	DT6D5	ST-6-005	TC-25	" "
11	.005	150	A16-181	484-005	DT6D5	ST-6-005	TC-25	AF Screen Bypass
12	.05	200	A16-171	484-05	DT2S5	ST-4-05	TC-15	RF Bypass Power Supply
13	.005	150	A16-181	484-005	DT6D5	ST-6-005	TC-25	IF Grid Filter
14	.005	150	A16-181	484-005	DT6D5	ST-6-005	TC-25	Conv. Screen Decoup.
15	.05	400	A16-172	484-05	DT4S5	ST-4-05	TC-15	Fil. Bypass
16	.005	150	A16-181	484-005	DT6D5	ST-6-005	TC-25	AVC Filter
17	50	300	A15-191	1468-00005	5W5Q5	MO.5-45	1FM-45	AF Plate Bypass
18	100	300	A15-190	1468-0001	5W5T1	MO.5-31	1FM-31	Diode RF Filter
19	100	300	A15-190	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
20	100	300	A15-190	1468-0001	5W5T1	MO.5-31	1FM-31	Osc. Grid Cap.
21	100	300	A15-190	1468-0001	5W5T1	MO.5-31	1FM-31	Ant. Coupling

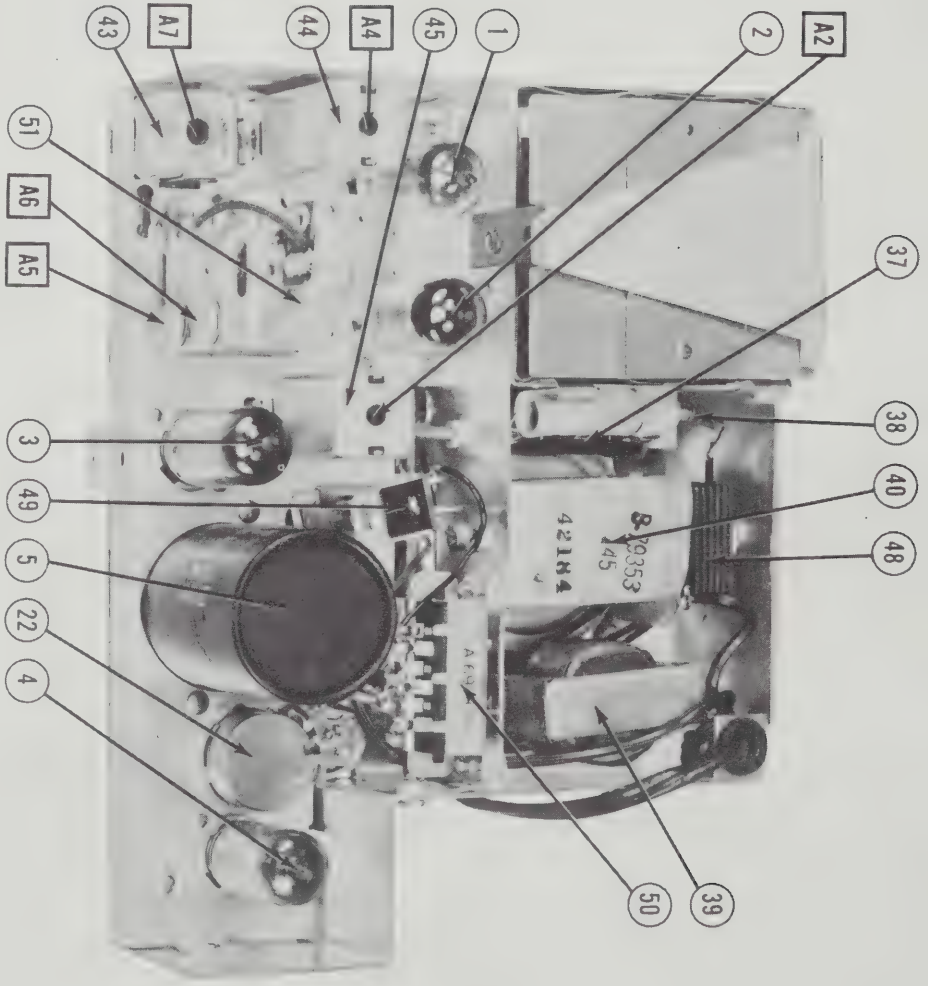
CONTROLS

ITEM No.	RATING		REPLACEMENT DATA			INSTALLATION NOTES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	
22A	1 Meg.	½	A24-172	D13-137	M-63-2	Volume Control
B	Shaft		Not Req.	A	Not Req.	Attach to 22A per instructions

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	
23	2.2 Meg.	½	A60-726	BTS-2.2 Meg.	Red-Red-Grn. Conv. Grid
24	270Ω	½	A60-723	BW-½-270	Red-Vi.-Br. Conv. Screen Decoup.
25	100KΩ	½	A60-727	BTS-100K	Br.-Blk.-Yl. Osc. Grid
26	10 Meg.	½	A60-728	BTS-10 Meg.	Br.-Blk.-Blue IF Grid
27	1500Ω	½	A60-729	BTS-1500	Br.-Grn.-Red Fil. String
28	2.2 Meg.	½	A60-720	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
29	47KΩ	½	A60-730	BTS-47K	Yl.-Vi.-Or. Diode Filter
30	470Ω	½	A60-722	BTS-470	Yl.-Vi.-Br. Fil. String
31	10 Meg.	½	A60-728	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
32	2.2 Meg.	½	A60-726	BTS-2.2 Meg.	Red-Red-Grn. AF Screen
33	470KΩ	½	A60-731	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
34	2.2 Meg.	½	A60-726	BTS-2.2 Meg.	Red-Red-Grn. Output Grid
35	1500Ω	½	A60-729	BTS-1500	Br.-Grn.-Red Fil. String

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	
36	330Ω	1	A60-724	BTA-33[illegible]	Or.-Or.-Red Filter
37A	1000Ω	10	A60-713	AFA-[illegible]	Filament Dropping
B	1000Ω	10	A60-713	AFA-[illegible]	" " See Note
38	100Ω	3	A60-725	AB-150	Br.-Blue-Br. Surge Limiter

Note-On IRC replacement, set slider at center.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
39	9200Ω	3.5Ω	840Ω	.5Ω	B-30-231	A-3843	T22S47	A-2900	

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
	FIELD	VC IMP.				
40	PM	3.5Ω	B79-353		3A07	
	CONE DIA.	VC DIA.				
41	3-15/16"	9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	
42	Loop Ant.		1.5Ω	S-4-207		Part # Includes complete front cover.
43	Osc. Coil	2Ω	7Ω	B10-477		
44	Input IF	22Ω	22Ω	C10-475	16-6668	
45	Output IF	22Ω	22Ω	C10-475	16-6669	

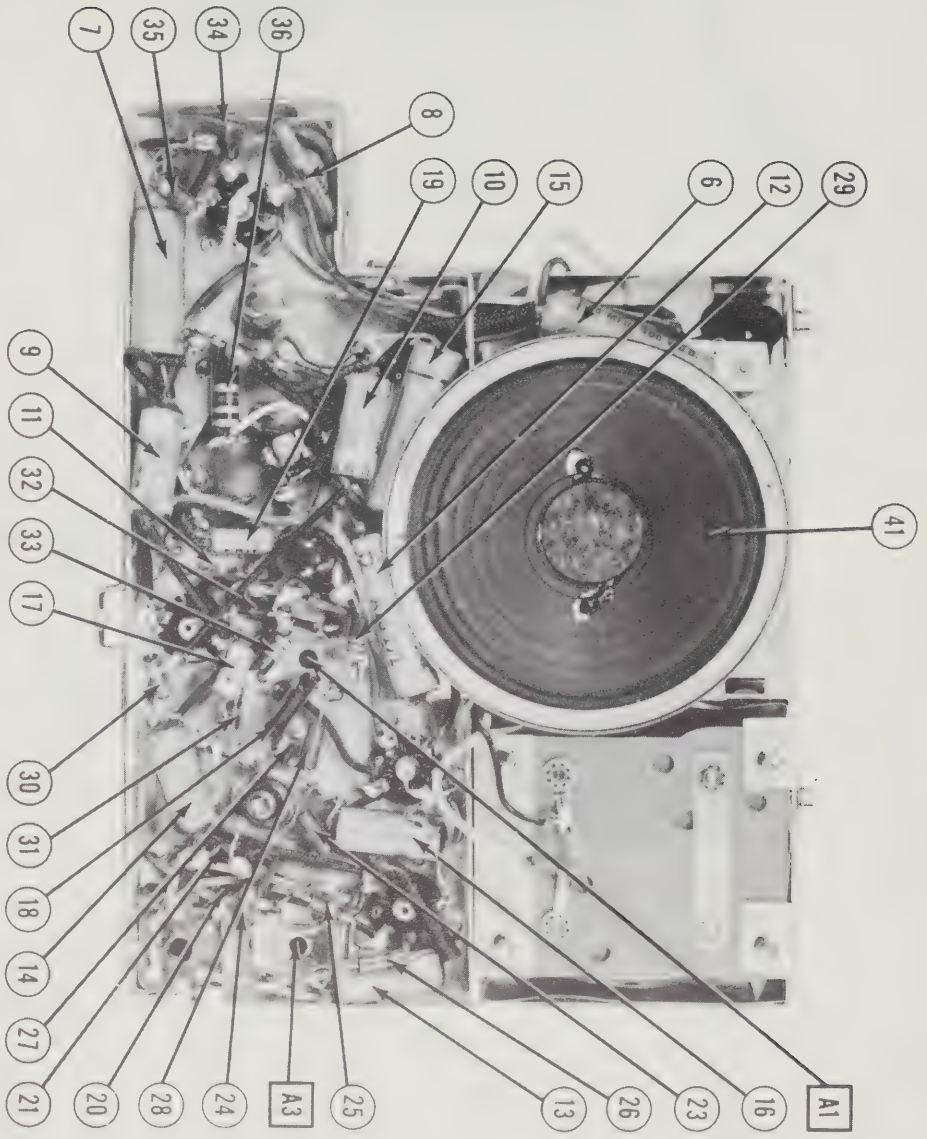
BATTERIES

ITEM No.	VOLTAGE	TRUETONE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
46	6V "A"		950			2R			4 Used in series
47	67.5V "B"			467			XX45		

MISCELLANEOUS

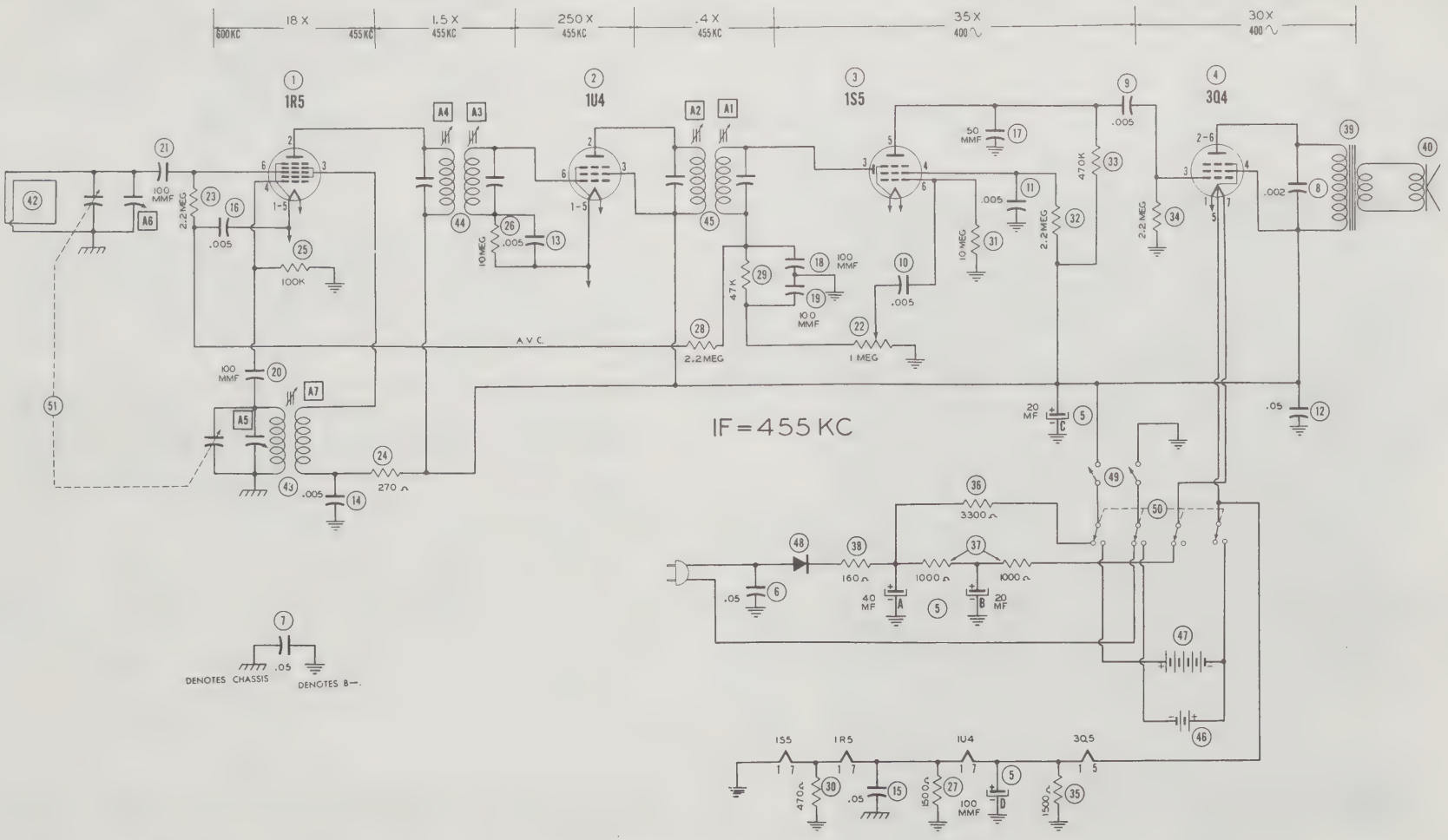
ITEM No.	PART NAME	TRUETONE PART No.	NOTES
48	Rectifier	A[illegible]-[illegible]	Selenium
49	Switch	A69-175	On-Off (Power)
50	"	A69-174	AC/DC-Batt.
51	2 Gang Var. Cap.	B19-190	(30-440MMF, 18-156MMF)
	Pointer Assbly.	S-4-111	
	Knob	A[illegible]-[illegible]	

CHASSIS—BOTTOM VIEW



DATE 10/46-#4817-24 SST #47-FOLDER #24

TRUETONE MODEL D-11



VOLTAGE AND RESISTANCE READINGS TAKEN IN AC-DC POSITION.

VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	1.4VDC	75VDC	75VDC	-11.5VDC§	1.4VDC	0V.	2.8VDC
2	1U4	2.8VDC	75VDC	75VDC	0V.	2.8VDC	0V.	4.2VDC
3	1S5	0V.	0V.	-2.5V.	-1.5V.	-1.5V.	0V.	1.4VDC
4	3Q4	4.2VDC	75VDC	0V.	75VDC	5.7VDC	0V.	7.3VDC

§TAKEN WITH VACUUM TUBE VOLTMETER.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	1R5	*	4KΩ	4.2KΩ	100KΩ	*	5.4 Meg.	*
2	1U4	*	4KΩ	4KΩ	INF.	*	10 Meg.	*
3	1S5	0Ω	INF.	1 Meg.	2.2 Meg.	470K	1 Meg.	*
4	3Q4	*	4KΩ	2.2 Meg.	4KΩ	*	4KΩ	0

*DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1948

4817-24

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by shorting AVC to B-.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volts.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Line voltage maintained at 117 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

TRUETONE MODEL D4832
(Fact. #25C22-82)

TRUETONE MODEL D4832

TRADE NAME	Truetone, Model D4832 (Fact. #25C22-82)
SUPPLIER	Western Auto Supply Co., 2107 Grand Ave., Kansas City, Mo.
TYPE SET	Battery Operated Universal Automotive Superheterodyne Receiver
TUBES (SIX)	Types, 6BA6 RF Amp., 6BE6 Converter, 6BA6 IF Amp., 6AV6 Det.-AVC-AF, 6AR5 Power Output, 6X4 Rectifier.
POWER SUPPLY	6 Volt Storage Battery
TUNING RANGE—BROADCAST	540-1600KC RATING 6 Amps. @ 6.6 Volts DC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer tune in a station whose frequency is known. Loosen knurled nut at the tuning control clamp fitting and turn flexible shaft until pointer indicates frequency of station being received. Tighten knurled nut.

Volume control should be at maximum position, output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1	.05 MFD.	High side to Pin 7 (grid) of 6BE6. Low side to chassis.	455KC	Tuning cores fully out.	Across voice coil	A1,A2, A3,A4	Adjust for maximum output.
2	60 MMFD	High side to ant. socket. Low side to chassis.	1600KC	"	"	A5	" " " "
3	60 MMFD	"	1400KC	Tune for maximum output.	"	A6 A7	Adjust for maximum output. Reinstall receiver in car.

With receiver installed in car, and antenna fully extended, tune in a weak station near 1400KC and adjust A7 for maximum volume.

HOWARD W. SAMS & CO., INC. Indianapolis Indiana

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1948 by Howard W. Sams & Co., Inc., Indianapolis, Indiana, U. S. A. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

TRUETONE MODEL D4 [illegible]

TUBES (SYLVANIA or Equivalent)

ITEM No.	USE	REPLACEMENT DATA: TRUETONE PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RMA BASE TYPE	INSTALLATION NOTES
1	RF Amp.	6BA6	6BA6	7BK	
2	Converter	6BE6	6BE6	7CH	
3	IF Amp.	6BA6	6BA6	7BK	
4	Det.-AVC-AF	6AV6	6AV6		
5	Power Output	6AN5	6AN5		
6	Rectifier	6X4	6X4	8PS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: TRUETONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	SOLAR PART No.	SPRAGUE PART No.	IDENTIFICATION CODES AND INSTALLATION NOTES
7A	20	350	45X355	AF44J4A	UP2350	DY-312	EL-312	Filter
B	10	350					"	"
C	20	25						Cathode Bypass
8	.5	100	46X305	484-.5	DT2P5	SHH-1	TC-5	Hash Filter
9	.004	100	CP54402	1084-004	MD1CD4	STM-16-C04	TR-24	Buffer
10	.01	100	C46X402	1084-01	MD16S1	STM-10-01	TR-11	Output Plate Bypass
11	.01	400	46X401	484-01	DT4S1	ST-4-01	TC-11	Audio Coupling
12	.005	200	46X400	484-005	DT2D5	ST-6-005	TC-25	" "
13	.05	400	46X397	484-05	DT4S5	ST-4-05	TC-15	RF Bypass Power Supply
14	.05	400	46X397	484-05	DT4S5	ST-4-05	TC-15	Screen Bypass
15	.05	200	46X358	484-05	DT2S5	ST-4-05	TC-15	AVC Filter
16	.001	400	46X399	484-001	DT4D1	ST-4-001	TC-21	Fixed Trimmer
17	.001	400	46X399	484-001	DT4D1	ST-4-001	TC-21	RF Coupling
18	2000	300	47X520	1467-002	1W5D2	MW-22	1FM-22	Tone Comp.-Cer.
19	100	300	47X497	1468-0001	5W5T1	MO.5-31	1FM-31	AF Plate Bypass-Cer.
20A	50	300	*	1468-00005	5W5Q5	MO.5-45	1FM-45	Diode RF Filter-Cer.
B	50	300	*	1468-00005	5W5Q5	MO.5-45	1FM-45	" " " "
21	47	300	47X495	1468-00005	5W5Q5	MO.5-45	1FM-45	Osc. Grid Cap. "
22	47	300	47X517					Fixed Trimmer "
23	100	300	47X497	1468-0001	5W5T1	MO.5-31	1FM-31	" " "
24	300	300		1468-0003	5W5T3	MO.5-33	1FM-33	Ant. Coupling "
25	22	500		1468-000025	5W5G25	MO.5-425	MS-425	Fixed Trimmer-See Note

*Items 20A & B and No. 35 are combined into one unit an may be obtained under Part #76X1.
Note-Not used in all models.

CONTROLS

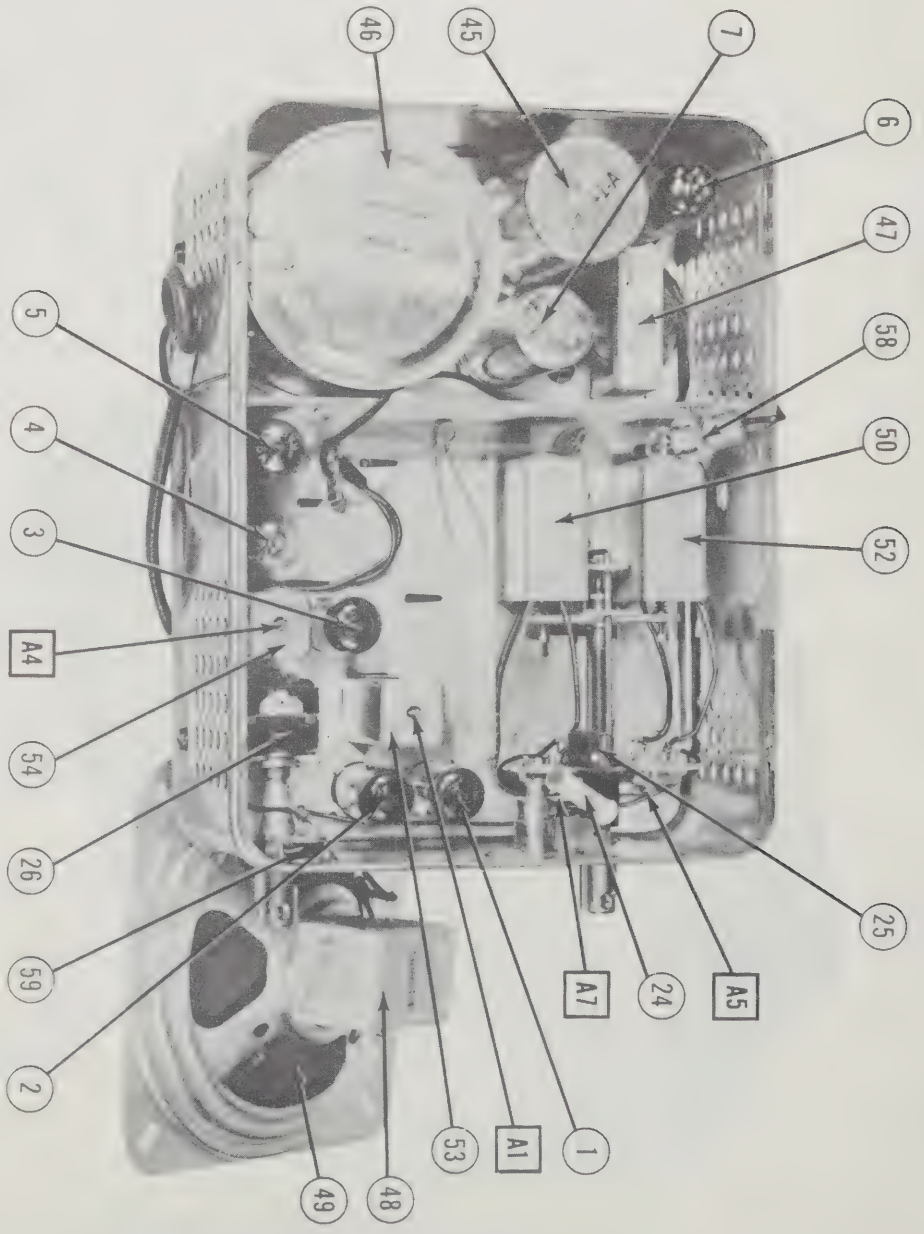
ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	CLAROSTAT PART No.	INSTALLATION NOTES
26A	500K Ω	½	36X206	D13-133	AM-60-Z	Volume Control
B	Shaft		Not Req.	B	DFS-¼*	Attach to 26A per instructions
C	Switch		" "	41	SW-A	" " " " "

*Use original funnel on shaft to duplicate original.

RESISTORS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: TRUETONE PART No.	IRC PART No.	IDENTIFICATION CODES
27	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. RF Grid
28	68Ω	½	B85680	BW-½-68	Blue-Gray-Blk. RF Cathode
29	10KΩ	1	C85103	BTA-10K	Br.-Blk.-Or. RF Plate Load
30	10KΩ	½	B85103	BTS-10K	Br.-Blk.-Or. Conv. Grid
31	22KΩ	½	B85223	BTS-22K	Red-Red-Or. Osc. Grid
32	8200Ω	1	C84822	BTA-8200	Gray-Red-Red Screen Dropping
33	68Ω	½	B85680	BW-½-68	Blue-Gray-Blk. IF Cathode
34	2.2 Meg.	½	B85225	BTS-2.2 Meg.	Red-Red-Grn. AVC Network
35	47KΩ	½	*	BTS-47K	Diode Filter
36	10 Meg.	½	B85106	BTS-10 Meg.	Br.-Blk.-Blue AF Grid
37	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. AF Plate Load
38	470KΩ	½	B85474	BTS-470K	Yl.-Vi.-Yl. Output Grid
39	560Ω	1	C84561	BTA-560	Grn.-Blue-Br. Output Cathode
40	470Ω	½	B85471	BTS-470	Yl.-Vi.-Br. Voltage Dropping
41	1800Ω	2	D84182	BT-2-1800	Br.-Gray-Red Filter
42	10KΩ	½	B85103	BTS-10K	Br.-Blk.-Or. Hash Supp.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		IDENTIFICATION CODES
	RESISTANCE	WATTS	TRUETONE PART No.	IRC PART No.	
43	56Ω	1	C95560	BW-1-56	Grn.-Blue-Blk. " "
44	56Ω	1	C95560	BW-1-56	Grn.-Blue-Blk. " "

*Items 35, 20A and 20B are combined into one unit and may be obtained under Part #76X1.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA		INSTALLATION NOTES
				TRUETONE PART No.	RADIART PART No.	
45	Interrupter	6.3 VDC	115 ∿	19A41-A	5301	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA			
	PRI.	SEC. 1	SEC. 2	SEC. 3	TRUETONE PART No.	STANCOR PART No.	THORDARSON PART No.	MERIT PART No.
46	6.3V DC @ 3.0A	500V CT .05A DC			53X2#			P-3371#

#Drill new mounting holes.

TRANSFORMER (OUTPUT)

ITEM No.	RATING				REPLACEMENT DATA				INSTALLATION NOTES
	IMPEDANCE		DC RES.		TRUETONE PART No.	STANCOR PART No.	THORDAR'N PART No.	MERIT PART No.	
	PRI.	SEC.	PRI.	SEC.					
47	6100Ω	3.6Ω	575Ω	.9Ω	51X137	A-3378‡	T22347‡	A-3031‡	‡Solder to chassis.

SPEAKER

ITEM No.	RATINGS		REPLACEMENT DATA			INSTALLATION NOTES
			TRUETONE PART No.	JENSEN PART No.	QUAM PART No.	
48	FIELD PM	VC IMP. 3.6Ω	12A485		5JA1	
49	CONE DIA. 5-3/16"	VC DIA. 9/16"				

R F COILS

ITEM No.	USE	DC RES.		REPLACEMENT DATA		
		PRI.	SEC.	TRUETONE PART No.	MEISSNER PART No.	
50	Ant. Coil		17Ω	†		†Items 50, 51 & 52 are ganged together and slug tuned. They are part of the complete tuning assembly. Which may be obtained under Part #20A100.
51	RF Coil		17Ω	†		
52	Osc. Coil	1.5Ω	7Ω	†		
53	Input IF	19.5Ω	17.3Ω	9A1961	16-[illegible]	
54	Output IF	16Ω	20.5Ω	9A1958	16-[illegible]	
55	P. Light Choke		0Ω	9A[illegible]		
56	Hash Choke		0Ω	13X609		
57	Vib. Choke		0Ω	9A1958		

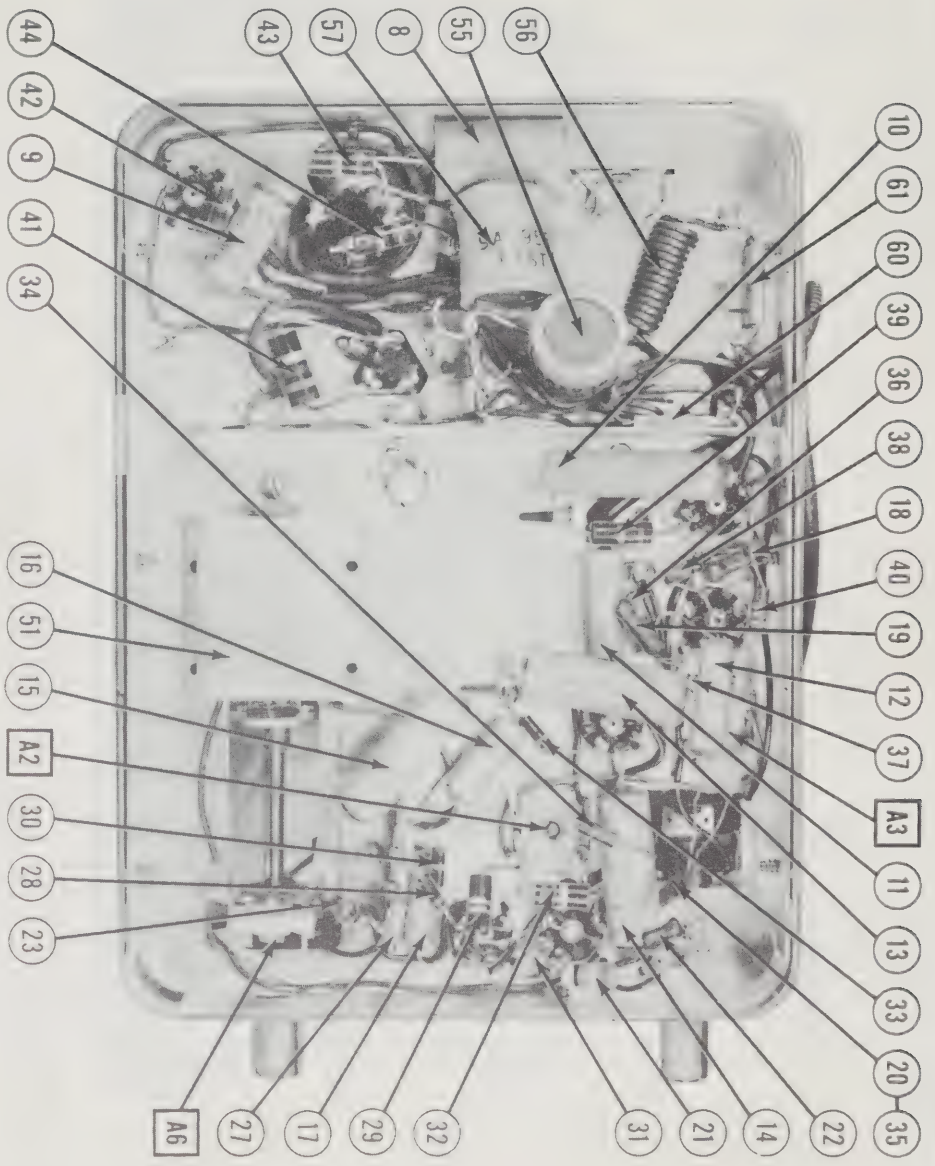
DIAL LIGHT

ITEM No.	BASE TYPE	VOLTS	AMPS.	BEAD COLOR	REPLACEMENT DATA		INSTALLATION NOTES
					TRUETONE PART No.		
58	Bayonet	7.5	0.2	White	7A32		Type #51

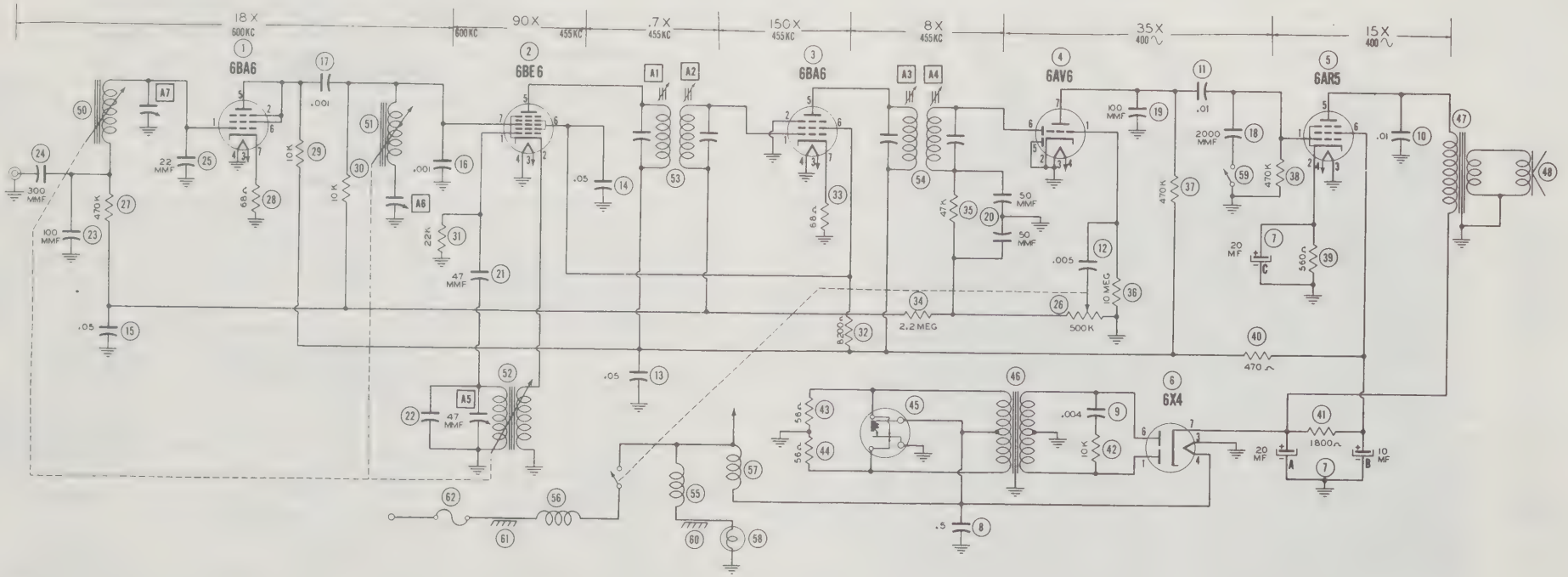
MISCELLANEOUS

ITEM No.	PART NAME	TRUETONE PART No.	NOTES
59	Switch	2A175	Tone
60	Spark Plate	47X129	
61	" "		
62	Fuse	16X27	1¼ amp.

CHASSIS—BOTTOM VIEW



TRUETONE MODEL D-52



VOLTAGE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	-.4VDC	75VDC	0V.	6.4VDC	75VDC	75VDC	.6VDC
2	6BE6	-9.4VDC	0V.	0V.	6.4VDC	165VDC	80VDC	-.4VDC
3	6BA6	-.4VDC	0V.	0V.	6.4VDC	165VDC	80VDC	.7VDC
4	6AV6	-.6VDC	0V.	0V.	6.4VDC	0V.	-.5VDC	65VDC
5	6AR5	0V.	12VDC	0V.	6.4VDC	225VDC	175VDC	0V.
6	6X5	250VAC	0V.	0V.	6.2VDC	-12VDC	250VAC	240VDC

§TAKEN WITH VACUUM TUBE VOLTMETER

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
1	6BA6	3.2 Meg.	240KΩ	0Ω	.1Ω	240KΩ	240KΩ	68Ω
2	6BE6	22KΩ	1.5Ω	0Ω	.1Ω	230KΩ	240KΩ	2.7 Meg.
3	6BA6	2.7 Meg.	0Ω	0Ω	.1Ω	230KΩ	240KΩ	68Ω
4	6AV6	10 Meg.	0Ω	0Ω	.1Ω	0Ω	550KΩ	700KΩ
5	6AR5	470KΩ	560Ω	0Ω	.1Ω	230KΩ	230KΩ	INF.
6	6X4	400Ω	INF.	0Ω	.1Ω	10KΩ	410Ω	230KΩ

RESISTANCE READINGS IN THE B+ CIRCUITS MAY VARY WIDELY
ACCORDING TO THE CONDITION OF THE FILTER CAPACITORS

A PHOTOFACT STANDARD NOTATION SCHEMATIC

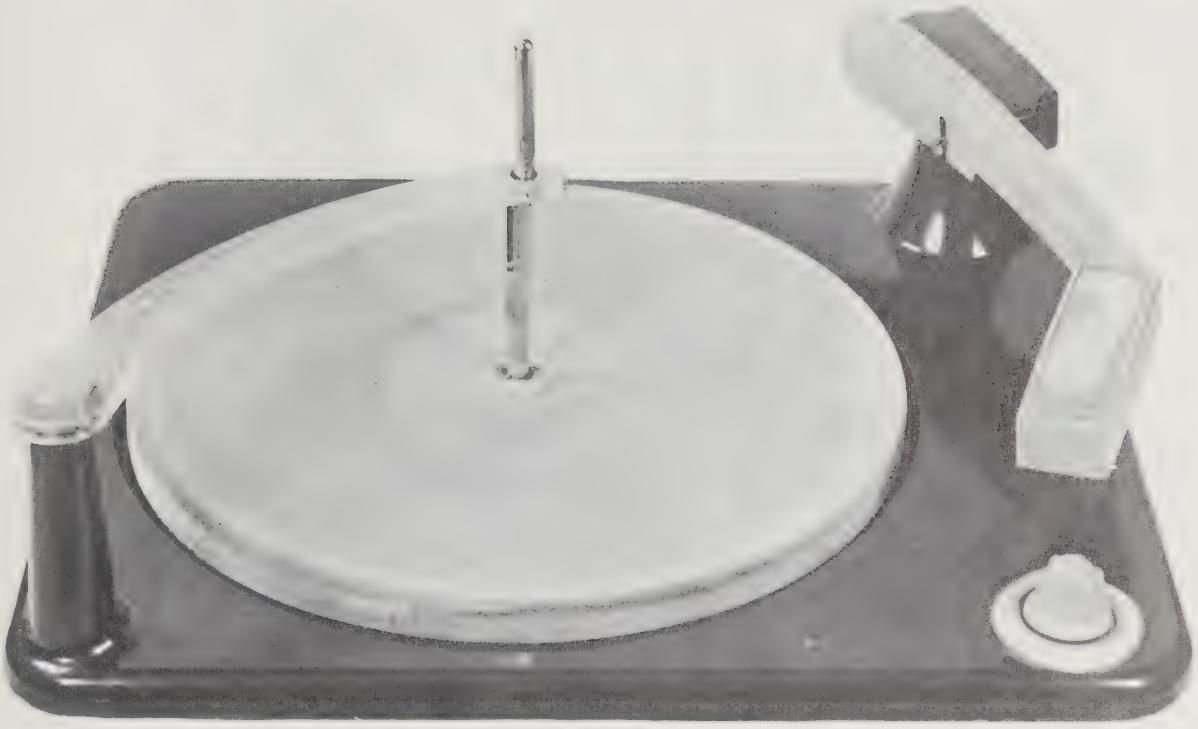
©Howard W. Sams & Co., Inc. 1948

4817-25

The stage gain measured values listed above are approximate values for an average operative stage, rather than an absolute value. It should be borne in mind that it is possible to introduce so many variables into the measurement operation, such as, type of equipment used for measuring, handling and placement of probes, the accuracy of alignment, etc., that an absolute reading is impractical. AVC is made inoperative by connecting negative (-) 3 volts to the AVC line.

1 - DC Voltage measurements are at 20,000 ohms per volt; AC Voltages measured at 1000 ohms per volt.
2 - Socket connections are shown as bottom views.
3 - Measured values are from socket pin to common negative.
4 - Battery voltage maintained at 6.6 volts for voltage readings.
5 - Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6 - Volume control at maximum, no signal applied for voltage measurements.

WESTINGHOUSE
MODEL 4914



TOP VIEW

WESTINGHOUSE
MODEL 4914

GENERAL INFORMATION

The Westinghouse V-4914 is a single-post changer designed to play automatically up to ten 12-inch records, twelve 10-inch records, or ten records intermixed. Upon completion of the last record, the pickup arm will return to a rest position on the rest post and will automatically shut off. The unit is designed to be jam proof. The pickup arm may be held and the control knob may be turned to any position during the change cycle.

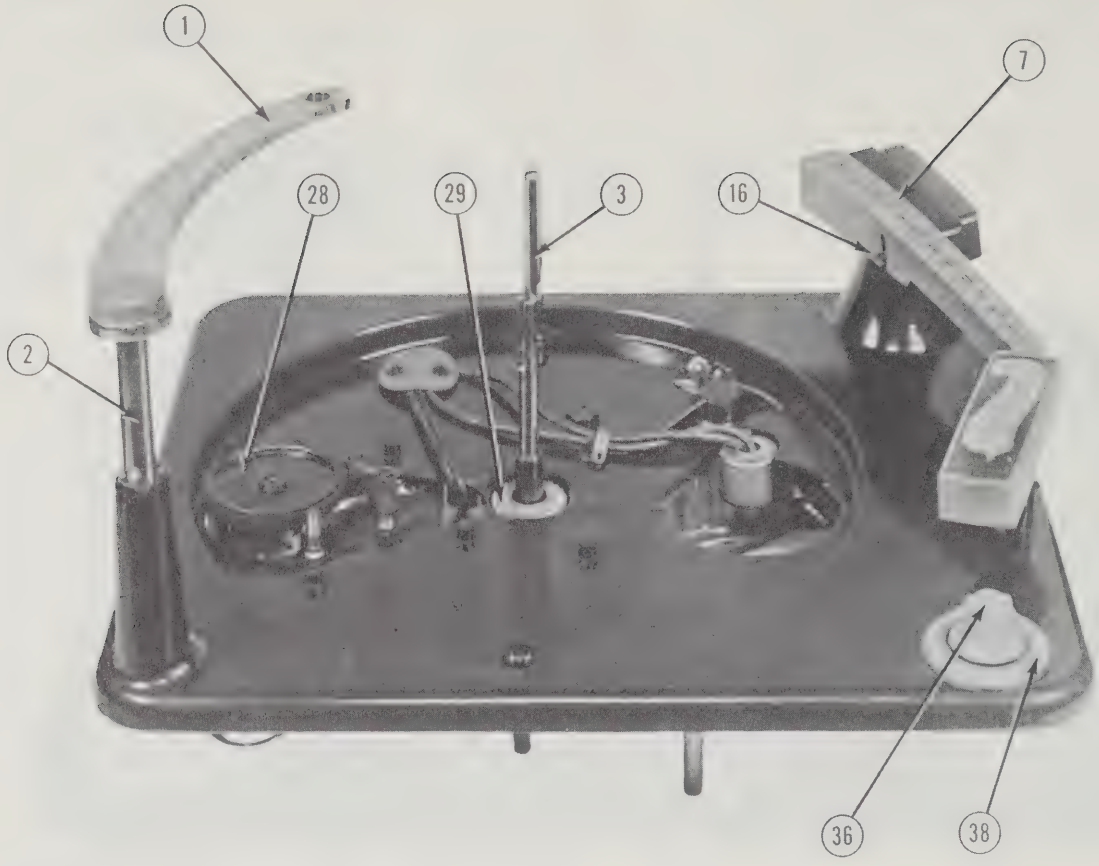
The motor is designed to operate on 110 to 120 volts, 60 cycles, A.C., unless otherwise marked. For operation on 110 volts, 50 cycles, AC, a special motor is required.

WESTINGHOUSE ELECTRIC CORPORATION • *Home Radio Division*
SUNBURY, PA.

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS INDIANA

COPYRIGHT 1948 • ALL RIGHTS RESERVED



TOP VIEW—LESS TURNTABLE

MANUAL OPERATION

Odd-sized, warped records and home recordings should be played manually:

1. Raise the record support (2) clear of the spindle and swing the record support in either direction until the pin in the support shaft drops into the locating groove.

2. Place a record on the turntable.

(a) For the record to pass the step on the spindle, tilt the record toward the back of the pickup arm and work the record carefully over the record.

3. Place the record support (2) over the spindle, letting it rest on the step of the spindle.

4. Turn the control knob (36) to the "On" position.

5. Press down on the trip lever (16) which is located near the back of the pickup arm (7).

6. Upon completion of the record, the pickup arm will return to a rest position on the rest post; that is, if the record has an eccentric cut-off groove. If the record does not have an eccentric groove, turn the control knob to "Reject" and release. The arm will then return to the pickup arm rest and shut off automatically.

AUTOMATIC OPERATION

1. Pull straight up on the record support knob (1) and swing the record support in either direction until the pin in the shaft drops into the locating groove.

2. Place as many as ten 12-inch, twelve 10-inch, or ten records intermixed on the off-set shoulder of the spindle. Steady the records with one hand and replace the record support over the spindle. Press down gently on the record support knob (1) until the records are parallel with the turntable.

3. Turn the control knob (36) to the "Reject" position and release. The changer will now play the entire stack of records. On completion of the last record, the pickup arm will be returned to a rest position on the arm rest and will automatically shut off.

4. To reject a record at any time while it is playing, turn the control knob to "Reject" and release.

REPEATING A RECORD

1. Pull straight up on the record support knob and swing the record support in either direction until the pin in the shaft drops into the locating groove.

2. Remove any records remaining above the off-set shoulder of the spindle. Do not replace the record support over the spindle. The changer will now repeat the top record on the turntable until the control knob is turned to the "Off" position.

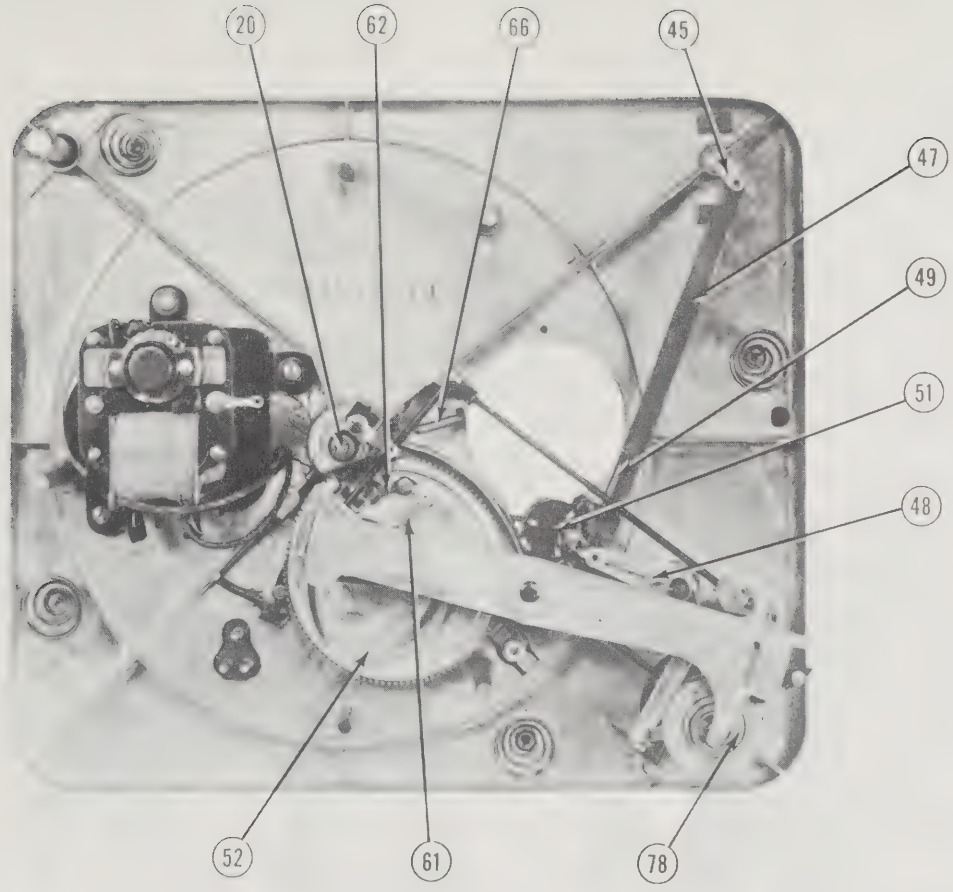
CHANGE CYCLE

When the control knob (36) is turned to the "On" position, it turns the control crank (45) and, in turn, moves the control link (47) and the control lever (48). Therefore, point (48A) of the control lever engages the switch arm of the switch assembly (51), turning the motor on and starting the turntable to rotate.

By turning the control knob to "Reject," point (48B) of the control lever is pivoted against the pin of the ratchet (76) moving it. The trip rod (65), which ordinarily rests against the cam pawl (62) to prevent the cam pawl from being engaged with the pinion gear (29), is now turned away from the cam pawl through the action of the ratchet (76). The cam pawl is now free to engage the pinion gear, thus turning the main cam (52) starting the change cycle.

The change cycle may also be started by the action of the pickup arm in eccentric groove of the record. As the pickup arm moves across the record, the ratchet pawl (70) slides along the serrated portion of the ratchet (76). At the end of the record, the oscillating action of the pickup arm in the eccentric groove causes the pawl (70) on the ratchet arm (69) to straighten, pushing against the ratchet. This pivots the ratchet and trip rod (65) which, as a result, releases the cam pawl (62) and allows it to engage with the pinion gear (29), thus turning the main gear (52) starting the change cycle.

As the main cam turns, the lift arm (82) is actuated by the roller (86) of the lift arm riding in the heart-shaped groove on the bottom of the gear. One end of the lift arm controls the movement of the pickup, while the other end actuates the spindle assembly (3).



BOTTOM VIEW

As the lift arm moves, the lift rod (79) rides up the cam surface (82B) of the lift arm (82), raising the pickup arm off the record. As soon as the pickup arm is fully raised, the cam surface (82C) contacts the boss extending down from the ratchet arm (69) swinging the pickup arm out to clear the records. As the pickup arm is swinging out, a projection on the set-down locator (43) snaps into a mating indentation in the ratchet arm (69) caused by the pressure of the lift rod spring (78) against the ratchet arm. When this occurs, the set-down locator turns with the ratchet arm. Inside the ratchet arm the safety spring (68) holds a casting on the bottom of the pickup arm locator assembly (46) against a stop surface inside the ratchet arm so that the two assemblies move together unless the pickup arm is held during the cycle. In this case, the safety spring allows the ratchet arm to move even though the pickup arm is held, thus preventing injury to the mechanism.

The pickup arm is moved out until a stop extending down from the hinge body (14) strikes a stop in the base plate. The pickup arm is now clear of the records so that they are free to drop to the turntable. After the hinge body strikes the stop, preventing the pickup arm and hinge body from moving farther, the lift arm (82) continues to turn the ratchet arm (69) a little farther around. By this movement, the ratchet arm turns the locator (43) which, in turn, turns the pickup arm locator (46), the hinge bearing (33), which is fastened to the pickup arm locator by screw (32), and the adjusting ring (11), which is fastened to the hinge bearing by the two set screws (8). This causes a gap between the end of one leg of the catch (13) and the stepped catch surface extending from the adjusting ring. This allows the catch spring (13A) to pull the leg on the catch (13) around until it hits the stop extending out at right angles to the outer step in the leg on the adjusting ring (11). In this position, the pickup arm will set down for 10-inch position. When a 12-inch record is dropped, the record hits the trip lever (16), which, in turn, pivots the hinge cam (15) against the catch (13) moving it away from the outer step of the adjusting ring. The catch is held in this position by the step in the hinge cam which rests on the surface of the catch to prevent the catch from returning to its original position. The pickup arm is now set for 12-inch setdown by the tension of the ring spring (10) which pulls against the hinge body (14).

At approximately the same time the cam surface (82C) contacts the boss on the bottom of the ratchet arm, cam surface (82A) contacts the spindle roller (20). The roller now rides up the cam, actuating the spindle assembly pusher (5) to move straight up the spindle so as to enter the center hole of the record. The bottom of the groove of the pusher now reaches the pin in the spindle and as the shaft continues to raise, it moves the pusher (5) forward pivoting it around the pin, thus dropping a record to the turntable. The portion of the pusher extending above the off-set ledge of the spindle is slightly less than the thickness of a record.

The guide (4), which is held down by the spindle guide spring inside the spindle, prevents more than one record at a time from being ejected. When records are removed from the turntable, the guide slides straight up allowing free movement up the spindle.

The heart-shaped groove in the bottom of the cam now reverses the movement of the lift arm (82), returning the spindle assembly to its original position and swinging the pickup arm in; thus the pickup arm is positioned for set-down and lowered to the record. When the lift pin (79) is completely lowered, the tension of the lift rod spring (78) against the ratchet arm (69) is released. The ratchet arm will now drop down forming a gap between the indentation in the ratchet arm (69) and the projection on the locator (43). This allows the pickup arm to have free movement on the record.

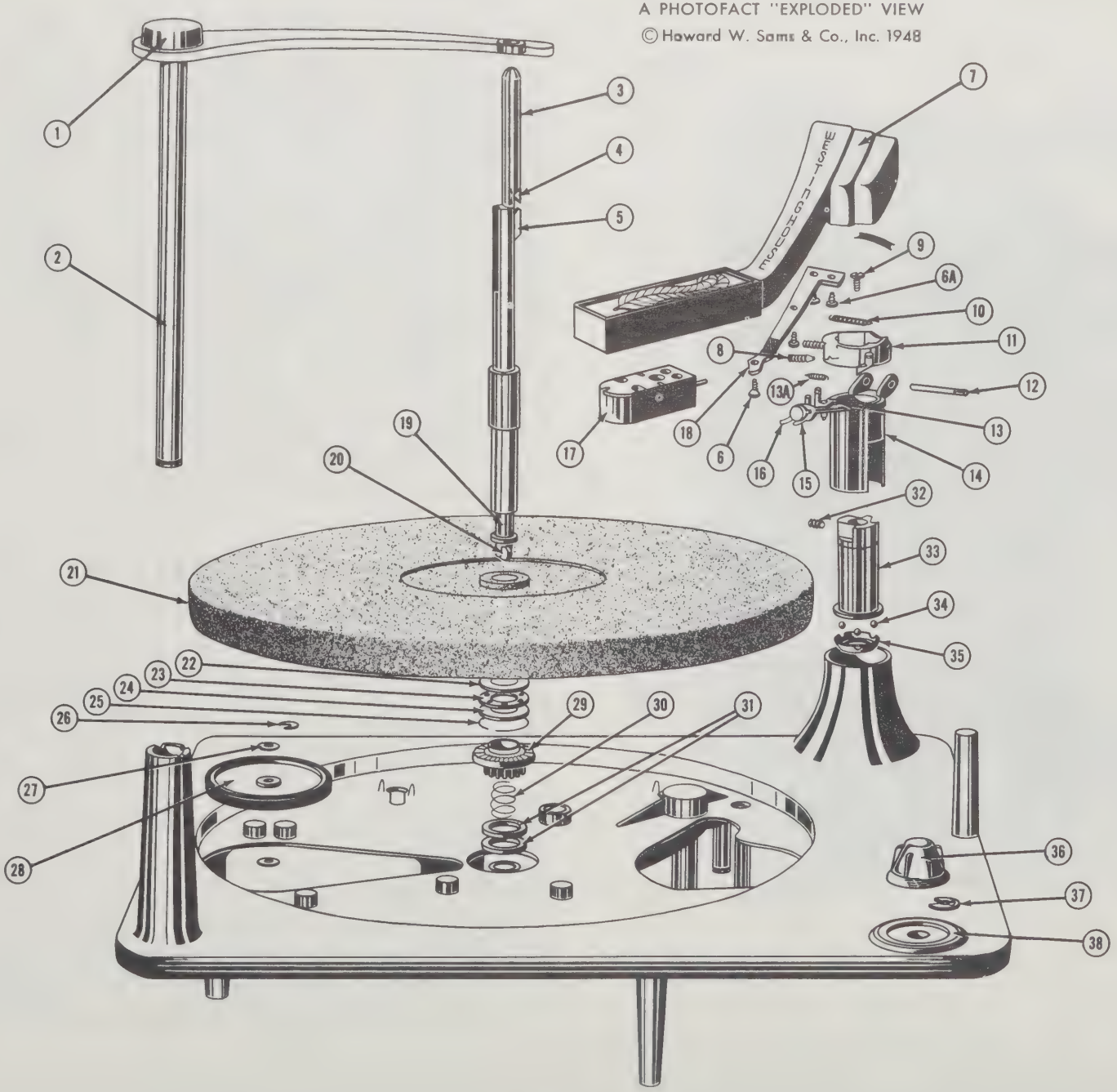
The cam pawl (62) of the main cam (52) now moves against the end of the trip rod (65) so as not to engage with the pinion gear (29). The open section of the main cam is held, in respect to the pinion gear, by the engagement of the cam locator (53) with the two studs on the top side of the main cam, thus completing the change cycle.

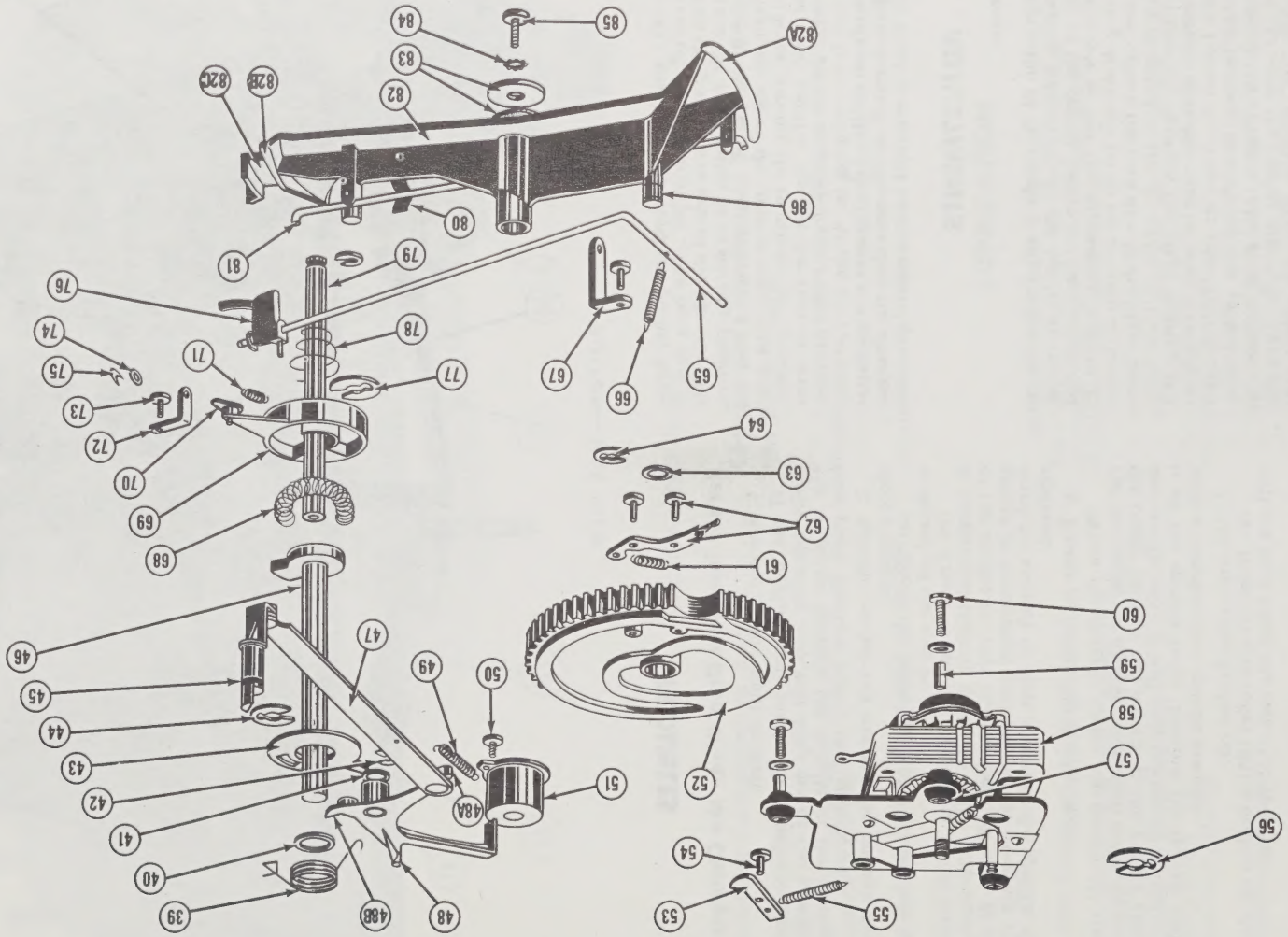
AUTOMATIC SHUT-OFF

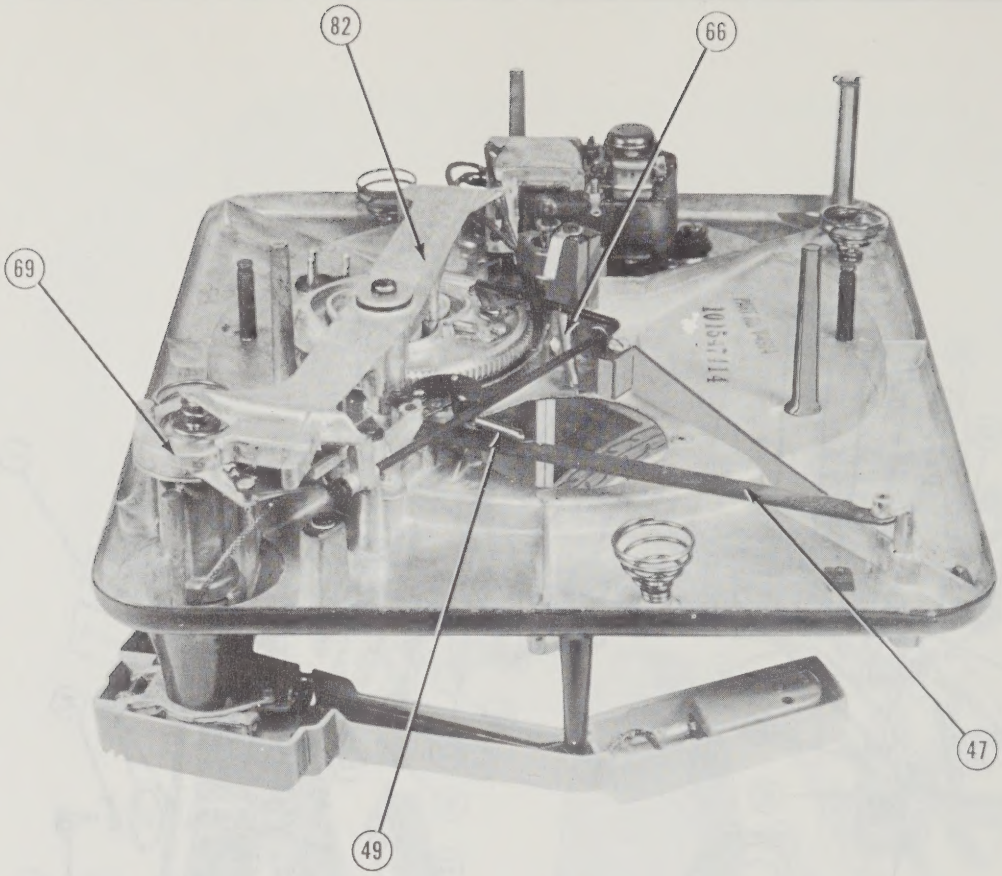
After the last record has been played, the record support (2), which is resting on the spindle ledge, prevents the record pusher (5) from moving forward; hence, the pusher housing (19) is prevented from moving up as far as it ordinarily does. This causes the roller spring inside the housing to be compressed by the roller plunger pushing upward, thus preventing injury to the spindle assembly. With the housing and shaft being held down, the bent end of

A PHOTOFACT "EXPLODED" VIEW

©Howard W. Sams & Co., Inc. 1948




84
85
82A
83
82C
82B
82
86
80
81
79
76
74
78
71
77
75
73
72
70
69
68
67
66
65
64
63
62
61
60
59
58
57
56
54
53
55
52
46
47
49
50
45
44
43
42
41
40
39
48B
48
48A
51



BOTTOM—SIDE VIEW

the cut-off lever (81) hits the ring around the pusher housing turning the cut-off lever around 90°. The bent end of the cut-off lever on the pickup arm side of the lift arm (82) is turned up. As the lift arm returns to its starting position, the turned up end of the cut-off lever contacts a boss extending down from one leg of the control lever, thus actuating the control lever, turning the switch to "off" position, and at the same time, another leg on the control lever catches the extension on the set-down locator (43) preventing the pickup arm from swinging in. As the lift rod rides down the incline of cam (82B) of the lift arm, the pickup is lowered to the pickup arm rest. The next time the changer cycles, the cut-off lever is returned to its original position.

ADJUSTMENTS

Needle Set-Down:

The set-down position of the needle is adjusted by means of the two adjusting screws (8). If the needle is setting down too far out on the record, loosen the back screw and tighten the front screw to lock the adjustment in place. If the needle is setting down too far in on the record, loosen the front screw and tighten the back one. If the hinge bearing (33) has been removed or the set screw (32) has been loosened, the relationship between the hinge bearing and the pickup arm locator assembly must be reset. The adjustment is as follows. Loosen the Allen set screw (32) enough to allow the hinge bearing to slide on the pickup arm locator assembly shaft (46). Place a 1/32" shim between the set-down locator (43) and the ratchet arm (69). Turn the control knob to the "off" position. Place the pickup arm on the rest. In this position the arm of the locator (43) should be in locked position by the leg of the control lever (48). Take up all the play between the parts by pressing up on the bottom of the ratchet arm (69) and down on the hinge bearing (33). Tighten the set screw (32) with an Allen wrench and remove the shim.

Pickup Arm Height:

The height of the pickup arm is adjusted by the screw (9) located on top of the lift rod (79). The height should be adjusted so that the underneath side of the pickup arm clears the rest post by ⅛" to 3/16".

TROUBLES

Record Does Not Drop When the Changer Cycles:

1. Spindle pusher shaft broken:

If the pusher shaft inside the spindle is broken, the roller assembly (20) will drop out of the spindle. Loosen the set screw holding the spindle in the housing in the base plate. Replace with a new spindle unit.

2. Spindle pusher not moving far enough forward to eject a record:

(a) Check the screw that holds the lift arm to see if it is turned all the way in.

(b) Check to see if roller spring in the housing (19) is compressed slightly when the roller (20) nears the end of the incline on cam (82A) of the lift arm. If the roller spring is compressed and the pusher does not move forward far enough to eject a record, the spindle should be replaced.

3. Pusher raises outside spindle body:

When the changer cycles, the pusher (5) should first rise up inside the spindle body, then move forward inside the center hole in the record. If the pusher rises outside the spindle body, it will raise the record instead of pushing it off the spindle ledge. Remove the spindle and replace with a complete new spindle assembly.

4. Lift arm roller broken off:

(a) If the lift arm roller (86) is broken off, the lift arm will not turn when the cam (52) revolves.

Two Records Drop at Once:

1. Hole in records too large.
2. Spindle slide not fully down:

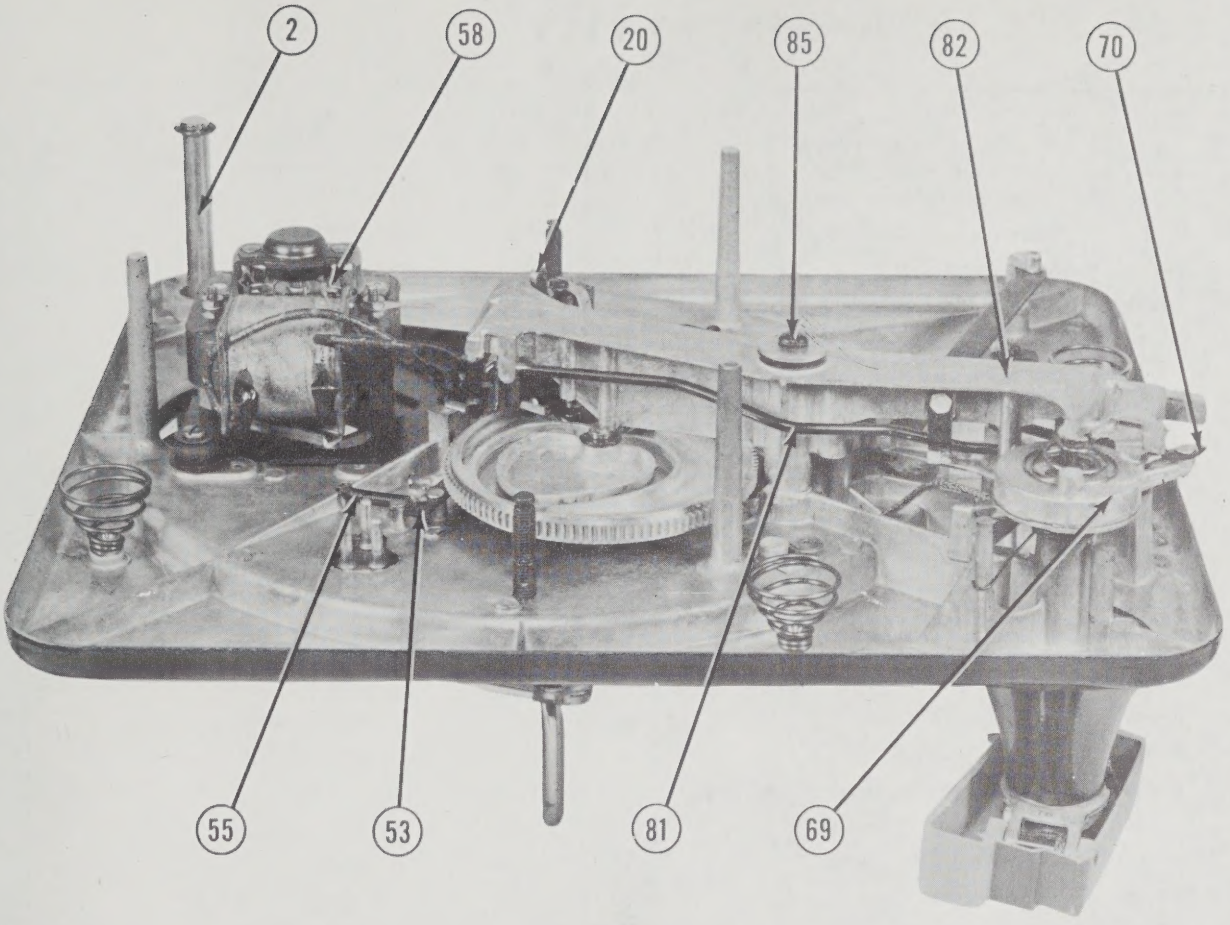
(a) Check the slide (4) to see if it is bent or binds at any point.

3. Record support binding on spindle:

(a) Check spindle to determine if it is straight.

(b) Check record support to see if it is square with the spindle.

(c) Check for bind of the record support shaft (2) in the shaft post on the base plate.



BOTTOM—REAR VIEW

Changer Trips Before Completion of Record:

1. Hole in record too large.
2. Trip rod binds.
3. Spring (66) loose not holding trip rod (65) in engagement with the cam pawl (62).

Changer Does Not Cycle on Completion of Record:

1. Trip rod (65) binds.
2. Pawl (62) binding.
3. Rough surface on end of trip rod.
4. Spring (61) loose.

Needle Does Not Track Across the Record:

1. The set-down locator binds on the ratchet arm:
   (a) There should be a 1/32" gap between the ratchet arm (69) and the locator (43) when the mechanism is not in cycle. See "Needle Set-Down Adjustment."
2. Hinge bearing binds:
   (a) Lubricate with light oil.

Changer Continues to Cycle:

1. Insufficient tension of spring (61).
2. Trip rod binding in bearings (67 and 72).
3. Reject spring (66) loose.
4. Check control crank (45), control link (47), and control lever (48) for binding.

Changer Shuts Off Prematurely:

1. Roller spring inside the housing (19) weak, therefore not pushing the pusher assembly high enough to clear the end of the cut-off lever.
2. Cut-off rod not being reset.

Changer Does Not Shut Off After Last Record Has Been Played:

1. Record support (2) binding and does not drop to spindle ledge.
2. Cut-off rod not engaging the ring on the housing (19):
   (a) Check the screw that holds the pickup arm to the base plate to see if it is turned all the way in.

LUBRICATION

Additional lubrication should not be required for the life of the changer, but in cases of unusual use or high operating temperature, the changer should be lubricated as follows: Apply Lubriplate to:

1. Hinge bearing (33).
2. Ratchet arm (69) and set-down locator plate (43).
3. Cam faces on lift arm (82), lift arm bearing, and lift arm cut-off rod bearings.
4. Between lever spring (80) and cut-off rod (81).
5. Heart-shaped cam track on cam (52) and cam bearing.
6. Spindle between roller plunger (20) and housing (19), and between the housing and the spindle body.
7. Turntable ball bearing (23).

Apply small quantity of light oil to:

1. Pickup arm locator assembly (46) and ball bearings (35) in pickup arm post.
2. Ratchet pawl bearing (70).
3. Trip rod bearings (67) and (72).
4. Control lever bearing (48).
5. Turntable and spindle bearing.
6. Pinion bearing (29).

PARTS LIST

Ref. No.	Part No.	DESCRIPTION
1		Record support knob (part of 2)
2	V-7192	Record support assembly
3	V-7147	Spindle assembly
4	V-7152	Spindle guide
5	V-7149	Record pusher
6	V-7157	Screw for strengthener
7	V-4976	Pickup arm
8	V-7067	Adjusting screw
9	V-7071	Height adjusting screw
10	V-7065	Adjusting ring spring
11	V-7068	Adjusting ring
12	V-7070	Hinge pin
13	V-7075	Catch
14	V-7072	Hinge body
15	V-7077	Hinge cam
16	V-7062	Trip lever
17	V-7017	Magnetic pickup
18	V-7094	Pickup arm strengthener
19	V-7156	Pusher and roller assembly
20	V-7164	Spindle roller
21	V-7056	Turntable
22	V-7057	Flat washer
23	V-7058	Turntable bearing
24	V-7057	Flat washer
25	V-7059	Retainer spring
26		"C" washer
27		Fiber washer
*28	V-7049	Drive wheel (for "G" motor)
*	V-7050	Drive wheel (for "A" motor)
*	V-7051	Drive wheel (for "R" motor)
29	V-7167	Pinion gear
30	V-7165	Pinion spring
31	V-7166	Fiber washers
32	V-7066	Set screw
33	V-7178	Hinge bearing
34	V-7169	Bearing ball
35	V-7184	Bearing spacer
36	V-7084	Control knob
37	V-7083	"C" washer
38	V-4979	Escutcheon
39	V-7185	Return spring
40	V-7170	Fiber washer
41	V-7095	Fiber washer
42	V-7096	"C" washer
43	V-7103	Set-down locator
44	V-7171	"C" washer
45	V-7106	Control crank
46	V-7181	Pickup arm locator assembly
47	V-7100	Control link
48	V-7104	Control lever
49	V-7098	Reject spring
50	V-7090	Screw No. 6 x ¼ type "Z"
51	V-7099	Switch assembly
52	V-7116	Cam
	V-7117	Cam assembly (includes 52, 61, and 62)
63	V-7121	Fiber washer
54	V-7074	Drive pin
55	V-7123	Cam locator spring
56	V-7141	"C" washer
57	V-7134	Rubber grommet
58	V-7136	Motor assembly, 110 volts, 60 cycles (including drive wheel 28)
	V-7140	Motor assembly, 110 v., 50 cycle (including drive wheel 28)
59	V-7133	Grommet spacer
60	V-7131	Screw No. 6 x ⅝" type "Z"
61	V-7114	Pawl spring
62	V-7118	Clutch pawl
	V-7074	Drive pin
63	V-7121	Fiber washer
64	V-7120	"C" washer
65	V-7093	Ratchet assembly, trip rod
66	V-7129	Trip spring
67	V-7128	Trip rod bearing
68	V-7172	Safety spring
69	V-7085	Ratchet arm
70	V-7087	Ratchet pawl
71	V-7088	Pawl spring
72	V-7089	Trip rod bearing
73	V-7090	Screw No. 6 x ¼" type "Z"
74	V-7092	Fiber washer
75	V-7091	"C" washer
76		Ratchet (part of item 65)
77	V-7141	"C" washer
78	V-7177	Lift rod spring
79	V-7173	Lift rod
80	V-7108	Lever spring
81	V-7102	Cut-off lever
82	V-7110	Lift arm
83	V-7127	Fiber washer
	V-7125	Lift arm washer
84		Lock washer
85	V-5050-82	Screw No. 8—32 x ⅜"
86	V-7113	Lift arm roller

* The type of motor is indicated by "G," "A," or "R" stamped on the upper side of the motor mounting plate. When ordering a replacement drive wheel, lift off turntable to see which letter is stamped on motor plate, and order the drive wheel for that motor.